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ABSTRACT

Designed to assist bilingual teachers in providing a coordinated program of studies for students in the Connecticut Migratory Children's Program and for other students whose native language is Spanish, this science curriculum for third grade is one of a series for pre-school through fifth grade. The overall focus of the guides is on Puerto Rican history and culture, placing the development of skills within the context of the experience and social identity of the child. A sequential approach is utilized. The guide contains seven units, related to those in the other third grade guides: Connecticut, Puerto Rico, Latin America, Europe, Asia, Eskimos, American Indians. Appropriate skills are presented in each unit; for example, the skills in the American Indian unit are: inferring the formation of clouds; identifying the types of clouds and symbols used to represent them; identifying the cause of rain; investigating the regulation of rainfall; making and using a rain gauge. Key vocabulary words are listed with each skill. Activities to motivate students to learn each skill are described. The illustrations provided can be copied for instructional use. Much of the material is given in Spanish and English. (CM)

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SCIENCE

GRADE
THREE

BILINGUAL-BICULTURAL
CURRICULUM
CONNECTICUT MIGRATORY
CHILDREN'S PROGRAM

CONNECTICUT STATE
DEPARTMENT OF EDUCATION

1978

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INTRODUCTION

Science Bilingual-Bicultural Curriculum For Grade Three is one of a series of curriculum guides. When the series has been completed there will be guides for pre-school through grade five students in the areas of social studies, language arts, science and mathematics. The purpose of these guides is to assist bilingual teachers in their efforts to provide a coordinated program of studies for students in the Connecticut Migratory Children's Program and for any other students whose native language is Spanish. In utilizing this curriculum guide it is important to be aware of the philosophical and instructional principles which were central to their development.

First, although the guides contain skills which are commonly considered appropriate to specific grade levels and activities which will facilitate the development of these skills, it has never been assumed that there is a single norm of achievement for all children at a given grade level. There should always be an effort to discover the skill level at which a child is functioning, to choose materials from curriculum guides at that skill level, and to move on to more difficult materials only when the child is ready. This is especially true for students who have had their schooling interrupted and disrupted by a migratory experience. The purpose of suggesting skills at given grade levels is simply to provide a logical sequence of skill development. Teachers must be sensitive to differences between children.

Although all the skills introduced in this curriculum series are for the most part sequential, this aspect is particularly critical in the mathematics and science curricula. It is, therefore, important for the teacher to make certain that the students have mastered the already introduced scientific/mathematic skills before proceeding on to a new concept. Whenever appropriate, the activities within each skill move from the simple to the complex. The latter activities within each skill are often appropriate for use as evaluations by the teachers of a skill learned.

Second, the focus of the curriculum for pre-school and kindergarten children is on developmental concepts. In the guides for grades one through five the focus is on social studies concepts and other curriculum areas--language arts, science, mathematics--are related to the social studies content. The overall focus of the curriculum guides is on Puerto Rican history and culture. Placing the development of language arts, mathematics and science skills within the context of the experience and social identity of the child enhances motivation to learn.

Third, the instruction program should make every attempt not to confuse children through simultaneous use of two languages. Nevertheless, a major effort should be made to provide common reference points for instruction in Spanish and English. Instructional methodology should have the English learning program "keyed" to the teaching that takes place in Spanish. The concepts and vocabulary taught in English should, whenever possible, be closely related to concepts and vocabulary which have already been learned in Spanish. In this way, new materials which are being introduced in English will have solid conceptual structures with which to be associated--conceptual structures which have already been established in the learner's native language.



CREDITS

This curriculum guide has been prepared by the New Haven Migratory Children's Program for the Connecticut Migratory Children's Program and the Connecticut State Department of Education. The preparation of this guide has been accomplished by a variety of people, including the following:

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The authors would like to extend their thanks to the following children for suggesting and trying out some of the activities:

Pang-Hua Kevin Chang

Pang-Mei Natasha Chang

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NOTE TO TEACHER

It is natural for most students in the elementary school to enjoy science. The simple reason is that they possess the most important quality for being a good scientist: CURIOSITY. Children are naturally curious. They are always asking why.

The teacher's role should be to encourage that curiosity and direct the students through a process towards finding a solution. This process includes fostering the following:

- observation
- not being afraid to ask questions
- seeking out solutions

The above may be carried out with direct experiences which include:

- direct contact (see, hear, smell, feel)
- excursions (visits to appropriate places)
- experiments (either doing them or teacher demonstration)
- use of reference materials (books, magazines, libraries etc.)
- use of resources (people or organizations)

As this inquiry process for teaching science is developed, the children will not only review old but also acquire new skills and concepts. These new skills and concepts must be taught sequentially to ensure logical development of the students' understanding of science.

It is recommended that teachers using this Science Curriculum For Grade Three become familiar with the concepts and skills covered in the Science Curriculum For Grade One and Science Curriculum For Grade Two. Should the need arise, it would be a good idea to review some of the earlier concepts and skills.

SCIENCE
BILINGUAL-BICULTURAL CURRICULUM FOR GRADE THREE

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UNIT I: CONNECTICUT

- SKILL A: Is able to identify the path of a moving object using cardinal points of the compass.
- SKILL B: Is able to know what is meant by the horizontal axis and the vertical axis in a grid.
- SKILL C: Is able to describe the location of a point using ordered numbers.
- SKILL D: Is able to describe the changes in the shadow of different objects.
- SKILL E: To infer that the changes in the position of shadows caused by the sun depend upon the rotation of the earth.
- SKILL F: Is able to identify some interdependency relationships between (among) the organisms of a community.
- SKILL G: Is able to describe some characteristics of the soil.
- SKILL H: Is able to infer the effect of various components of soil on the growth of a plant.

SCIENCE CURRICULUM FOR GRADE THREE

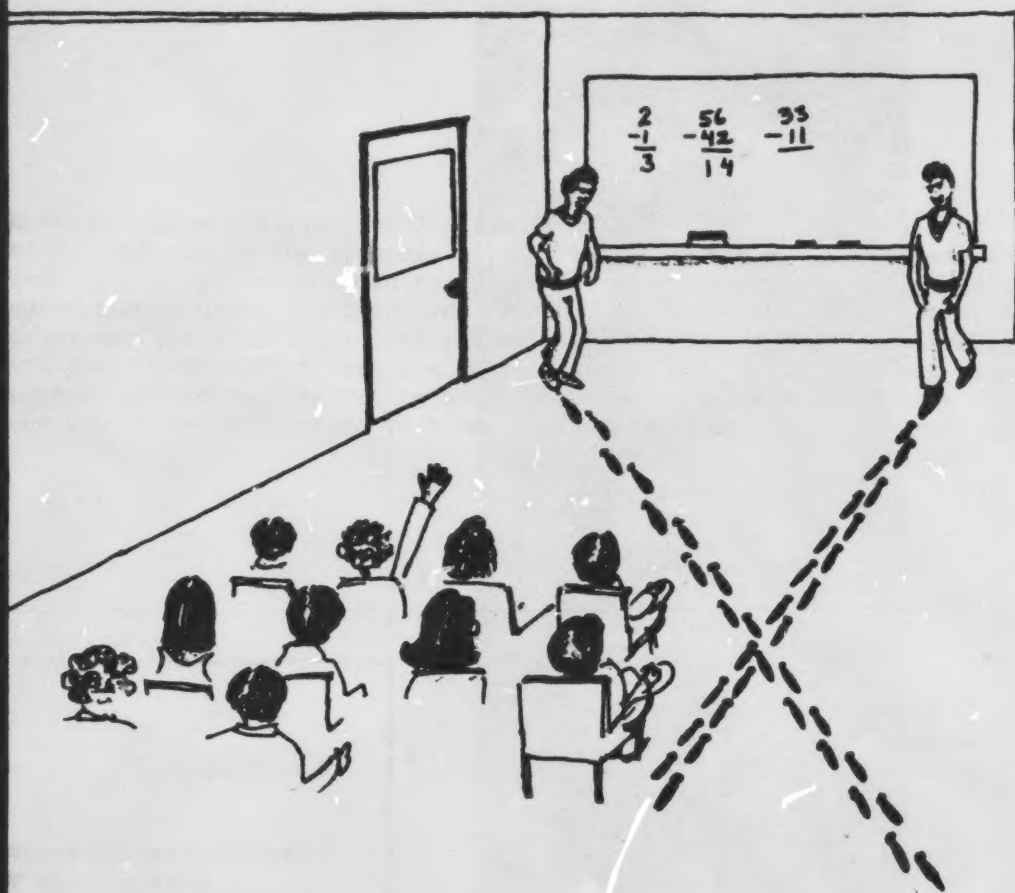
UNIT I: CONNECTICUT

SKILL A: Is able to identify the path of a moving object using cardinal points of the compass.

VOCABULARY: cardinal points
north
south
east
west
direction
compass
grid

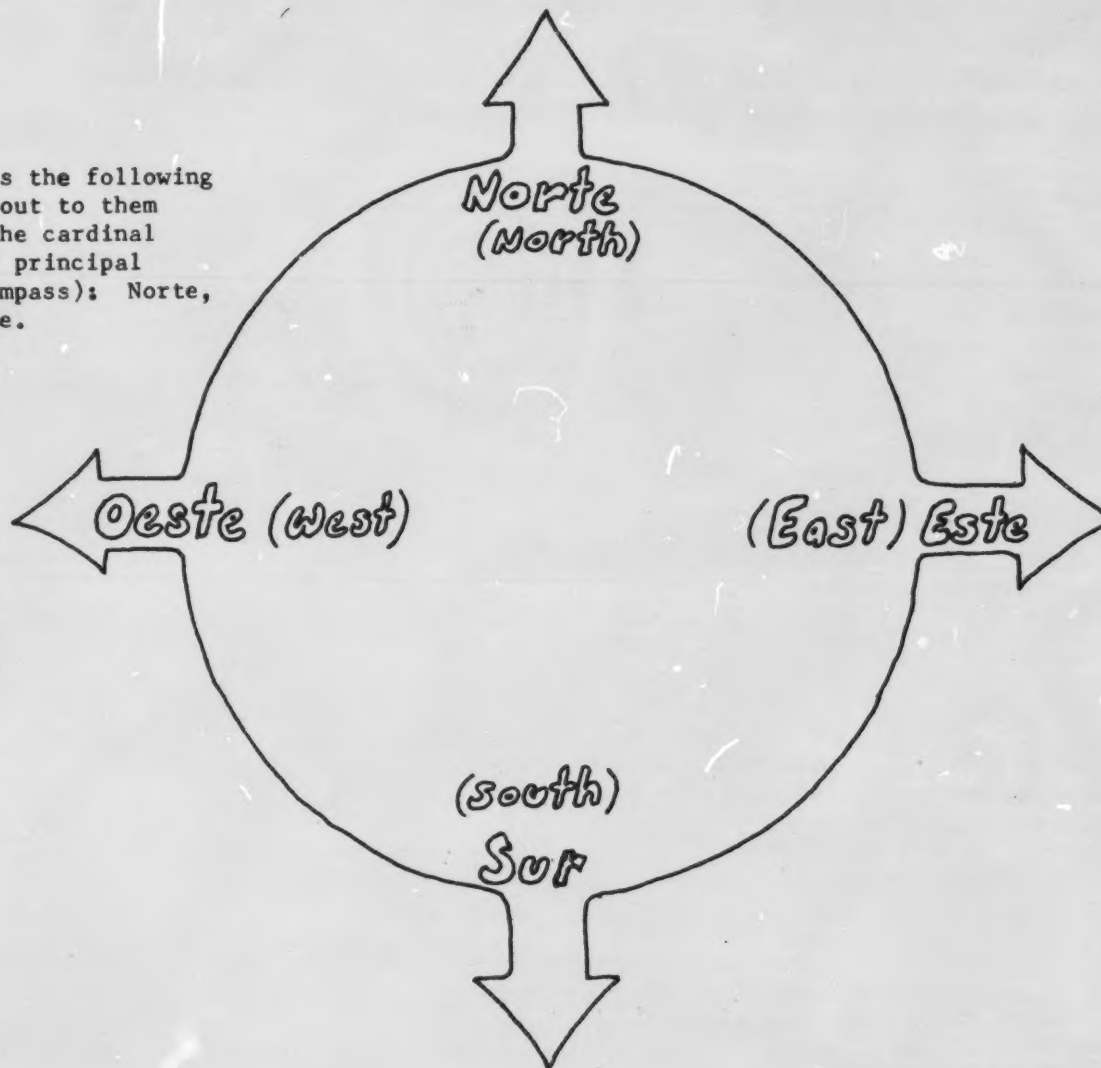
**FIRST
ACTIVITY
FOR
SKILL A**

Ask two students to stand in front of the class, one in each corner of the room. Direct them to walk twenty steps in any direction and to stop when they have paced off the twenty steps. Ask the rest of the class how far each one walked and in what other way the directions they travelled can be described. For example: ¿Hacia dónde caminó Juan? ¿Hacia dónde caminó María? ¿De qué otras formas podríamos describir hacia donde caminaron? (Hacia la derecha del salón, hacia la izquierda) etc. Indicate to the students that it is important to know a clear and exact way to describe the direction in which things move.



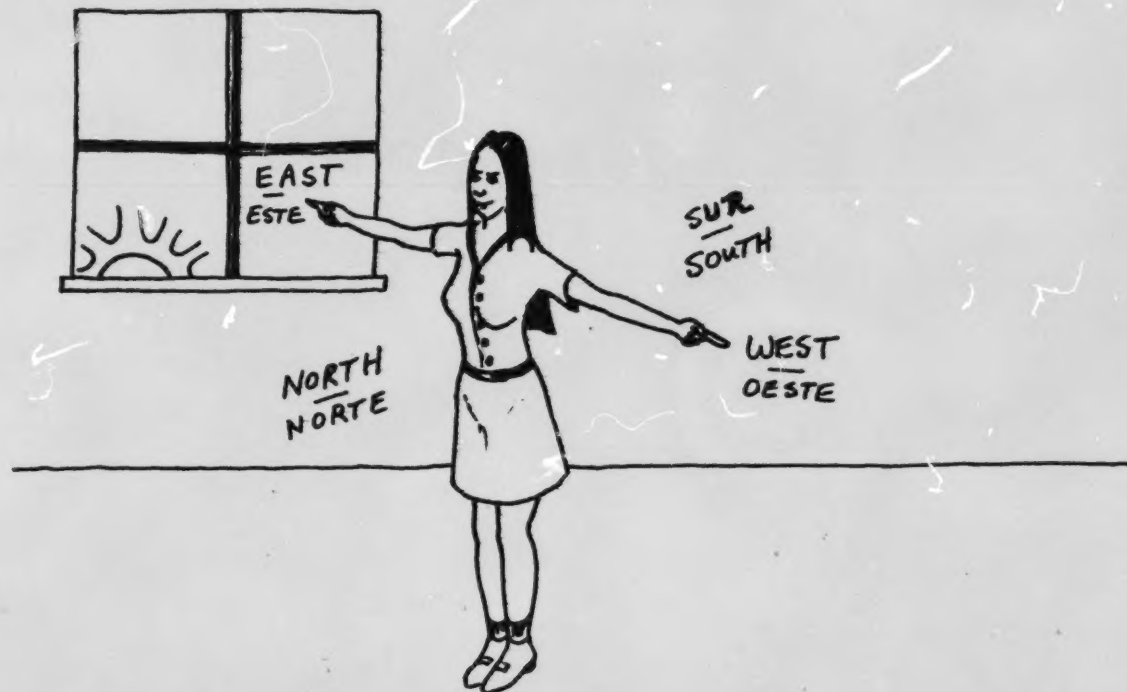
SECOND
ACTIVITY
FOR
SKILL A

Show the students the following diagram. Point out to them that these are the cardinal points (the four principal points of the compass): Norte, Sur, Este y Oeste.



THIRD
ACTIVITY
FOR
SKILL A

Show the students how to locate the cardinal points without a compass. Extend your right hand in the direction from which the sun rises in the morning. This point indicates the East. Extend your left hand in the opposite direction. The point indicated by the left hand is the West. As you stand with your hands extending towards the East and West, your face will look towards the North and your back will face the South. Identify the cardinal points in the classroom and label the corresponding places using cardboard labels.



FOURTH
ACTIVITY
FOR
SKILL A

Repeat the first activity in which two students each walk twenty paces. This time ask the students to describe the direction in which each student is walking, using the labels for the four cardinal points. A student might say, for example:

"Juan caminó quince pasos hacia el Norte y cinco pasos hacia el Sur. María caminó diez pasos hacia el Oeste y diez pasos hacia el Sur."

Give the students practice in following directions when they move from one side of the room to the other and when they give directions to their classmates.



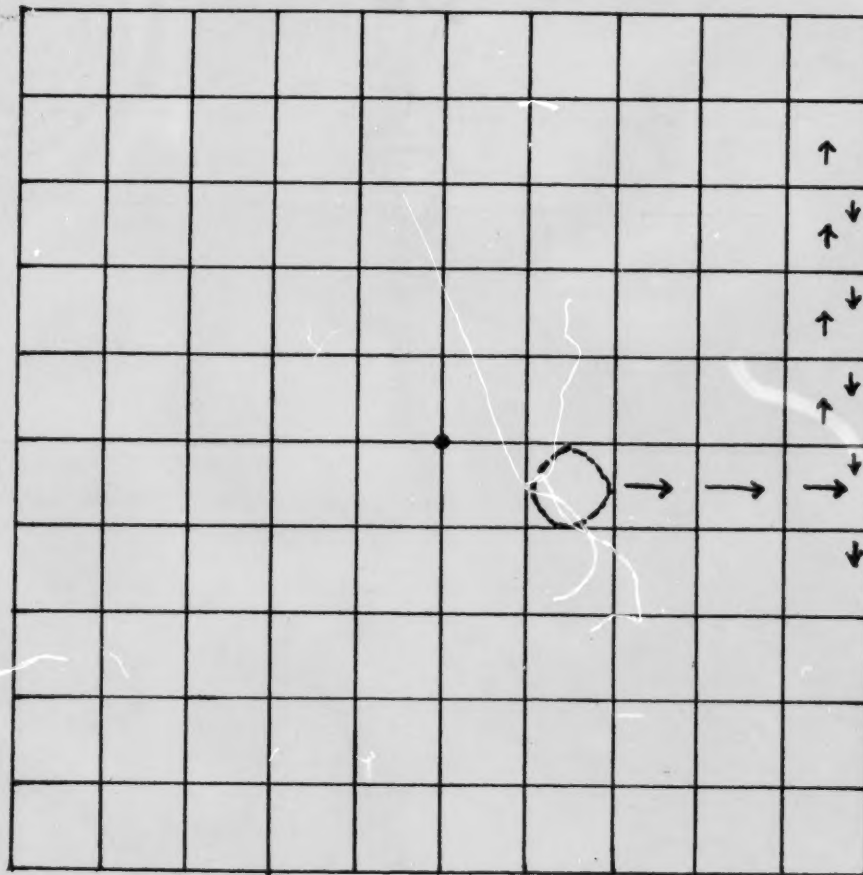
FIFTH
ACTIVITY
FOR
SKILL A

Distribute to each student a copy of a grid with the cardinal points indicated on it. Ask the students to draw a circle in one of the squares near the center of the grid. Tell them to move from this circle three spaces to the East, four spaces to the North, and five spaces to the South. They should then be able to answer the question, "¿Cuán lejos quedaron del punto de partida?"

Grid: a grid is a framework of lines equidistant from each other going north-south and west-east.

OESTE (west)

NORTE (north)



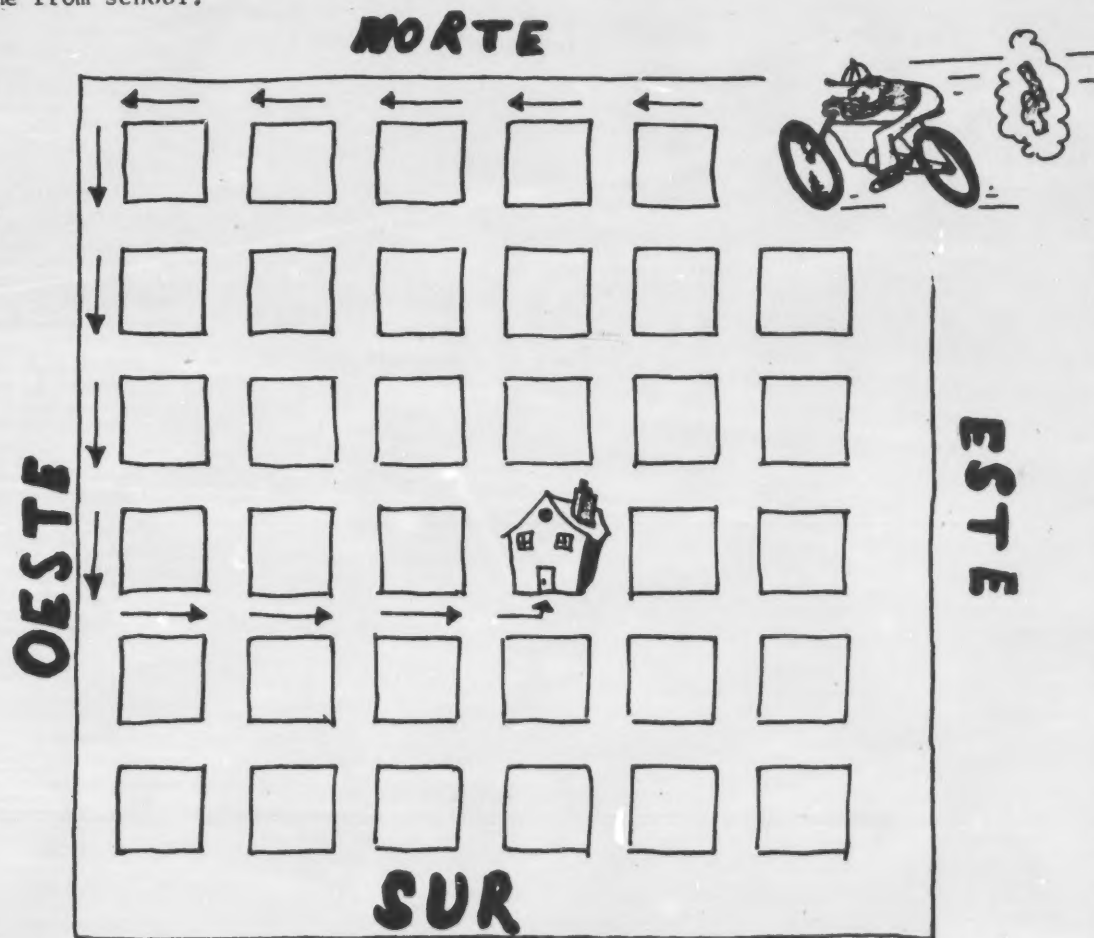
ESTE (east)

SUR (south)

SIXTH
ACTIVITY
FOR
SKILL A

Give each student a copy of the drawing below. Tell them to indicate how many blocks the boy travelled on his bicycle and in what directions he had to go in order to get home from school.

Si cada cuadro representa un bloque,
¿Cuántos bloques y en qué dirección
se movió el niño para llegar a su
casa desde la escuela?



SKILL B: Is able to know what is meant by the horizontal axis and the vertical axis in a grid.

VOCABULARY: horizontal line
horizontal axis
vertical line
vertical axis
axis
axes
grid

**FIRST
ACTIVITY
FOR
SKILL B**

Note: These activities must be done in sequence.

Give each student a sheet of lined paper. Ask each student to place the paper on his desk as if he were going to write on the paper. In which directions are the lines going? East to west (or west to east). In a graph, lines going east to west (or west to east) are called horizontal lines. Ask the children to turn their paper in such a way that the lines will go north to south. In a graph, these lines are called vertical lines. In science and mathematics, vertical lines and horizontal lines together form a grid.

**SECOND
ACTIVITY
FOR
SKILL B**

Distribute to each student a copy of a grid with the cardinal points indicated on it. Ask the students to darken all lines going from west to east (left to right). ¿Cómo se llaman estas líneas? (líneas horizontales). Ask them to darken all lines going north to south (up and down). ¿Cómo se llaman estas líneas? (líneas verticales).

**THIRD
ACTIVITY
FOR
SKILL B**

Distribute to each student a copy of a grid. Ask each to write the cardinal points on his grid. Each student should choose one horizontal line (near south) and one vertical line (near west) to darken. These will be the reference lines for this grid and are called the horizontal axis and the vertical axis. The point where they intersect (cross each other) is called the origin and is represented by the numeral 0 (zero). You may also refer to horizontal axis and vertical axis as two number lines in different positions.

SCIENCE CURRICULUM FOR GRADE THREE

UNIT I: CONNECTICUT

SKILL C: Is able to describe the location of a point using ordered numbers.

VOCABULARY: cardinal points
location
horizontal axis
vertical axis
ordered pairs

**FIRST
ACTIVITY
FOR
SKILL C**

Note: It is essential to review the usage of cardinal points (Skill A) before beginning this skill.

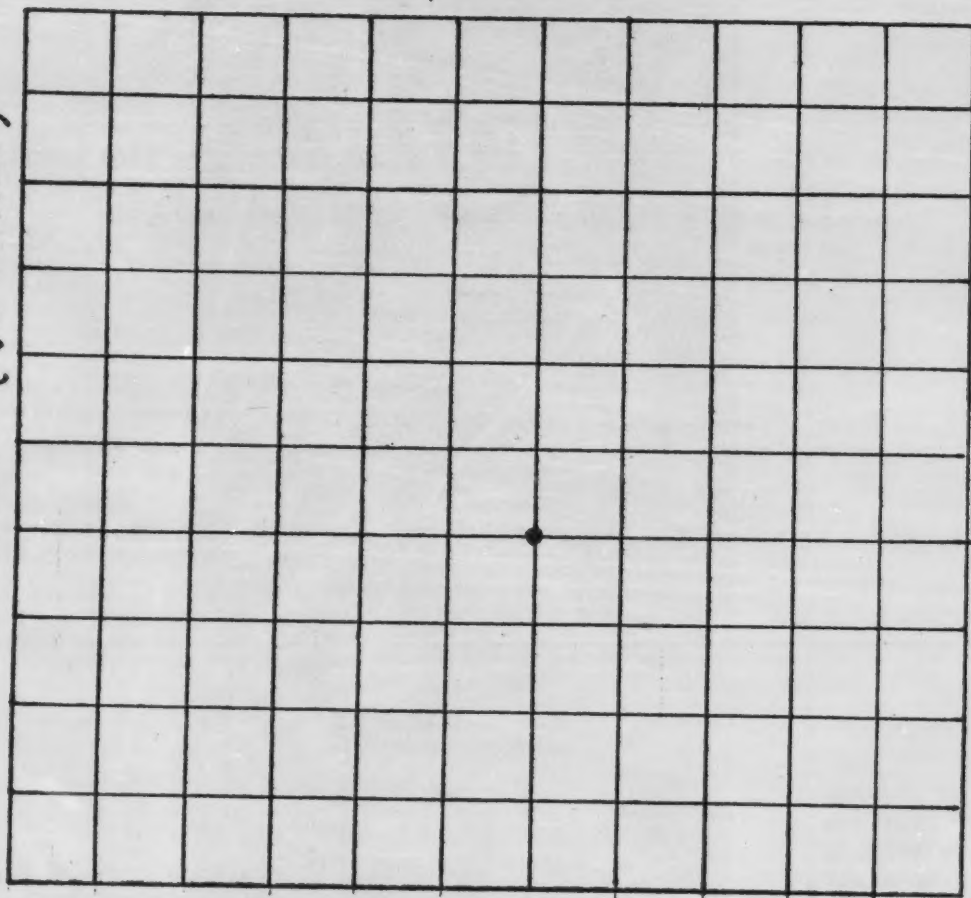
- a. Identify the coordinate points on a map of the United States.
- b. Locate Connecticut on the map and identify its location using coordinate points. For example:

Al norte de _____.

Al sur de _____.

- c. Show the students a grid. Identify the horizontal axis and the vertical axis. Refer to them as two number lines in different positions. Point out to them that each little square is formed by vertical and horizontal lines, which meet at a certain point.

Vertical (eje Vertical)



horizontal (eje horizontal)

SCIENCE CURRICULUM FOR GRADE THREE

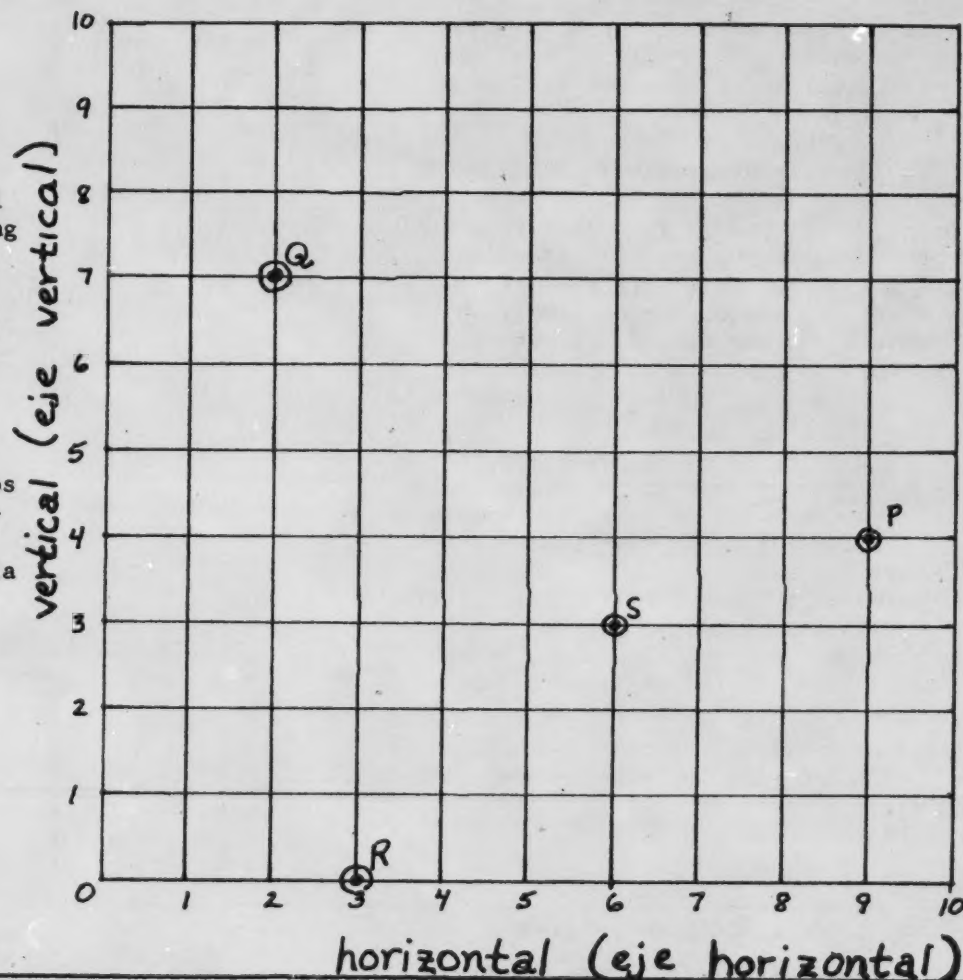
UNIT I: CONNECTICUT

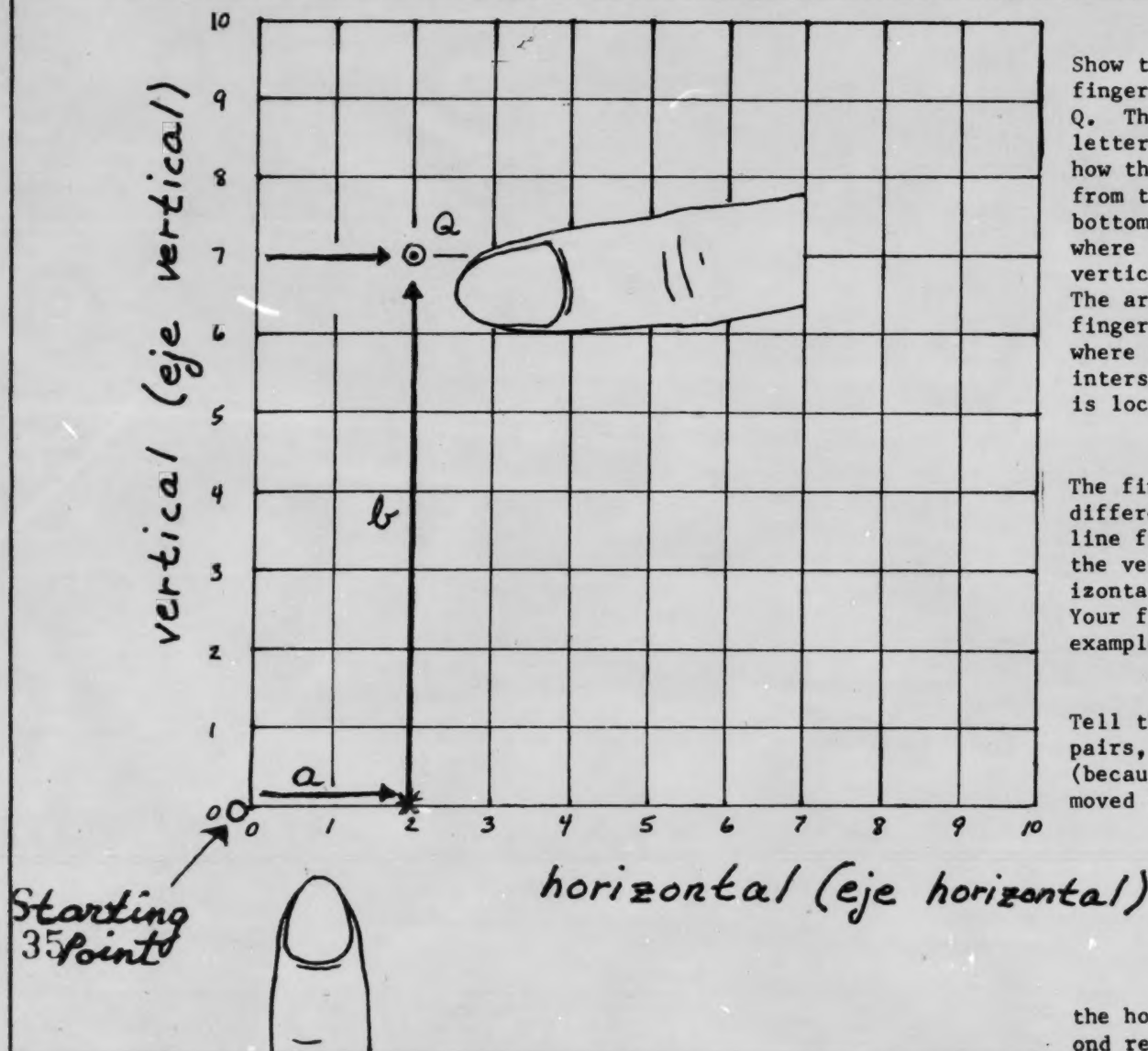
SECOND
ACTIVITY
FOR
SKILL C

Ask the students to observe the letters on the grid below (Figure 1). Tell them that the letters which appear on the grid represent the points Q, S, P, and R.

Invite the students to read the numbers that are on each axis. Tell them that they are going to find the numbers (ordered pairs) that represent the points of reference to determine the position of point Q, saying for example:

"Vamos a seleccionar los numerales (pares ordenados) que representan los puntos de referencia para determinar la posición del punto Q."





Show the students how to move their fingers to locate the desired point, Q. The arrows identified with the letter a and b (Figure 2) demonstrate how the finger must first be moved from the starting point, 0, on the bottom horizontal line to the point where that line intersects the vertical line on which Q is located. The arrow marked "b" shows how the finger must then be moved: from where the bottom horizontal line intersects the line on which Q is located (*) to point Q.

The fingers are moved across two different lines: on the horizontal line from 0 to the number 2, and up the vertical line from the bottom horizontal line to the 7 (vertical line). Your fingers meet at point Q. Ask for example:

"¿Qué numerales usaste?" (El 2 y el 7).

Tell the students that, as ordered pairs, the numbers are written (2,7) (because, to arrive at that point, they moved their fingers two units to the right and seven units up).

Invite the students to look for the ordered pairs of the points R, S and P. Make it clear to them that by convention, the first number in the ordered pair always represents the horizontal distance while the second represents the vertical distance.

SCIENCE CURRICULUM FOR GRADE THREE

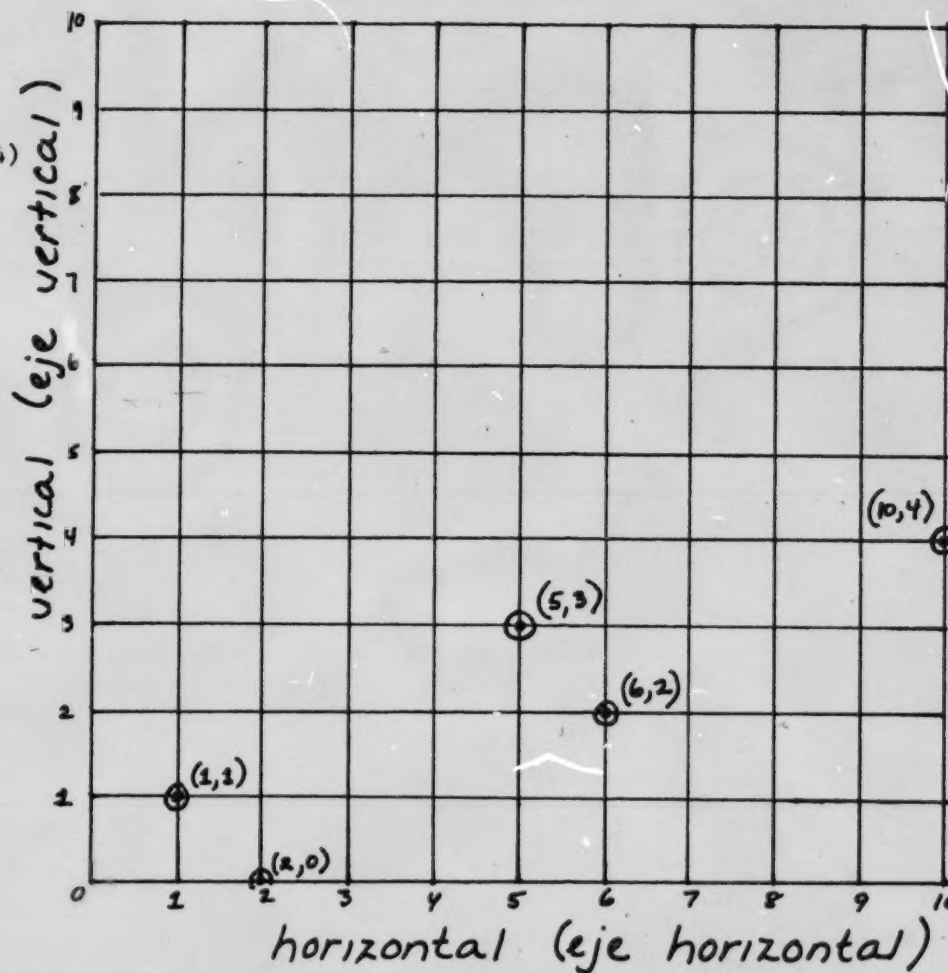
UNIT I: CONNECTICUT

THIRD
ACTIVITY
FOR
SKILL C

Give the students graph paper and have them identify and number each axis. Ask them to mark the points represented by the following pairs of ordinate numbers:

$(1,1)$; $(2,0)$; $(5,3)$; $(6,2)$; $(10,4)$

Their points should look like this:



SKILL D: Is able to describe the changes in the shadow of different objects.

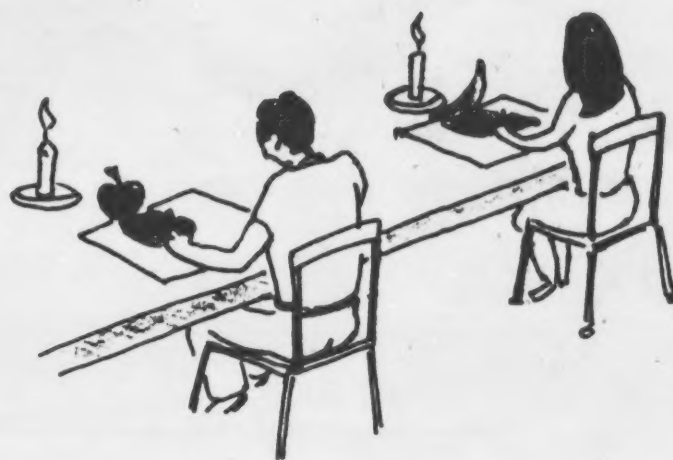
VOCABULARY: shadow
source of light

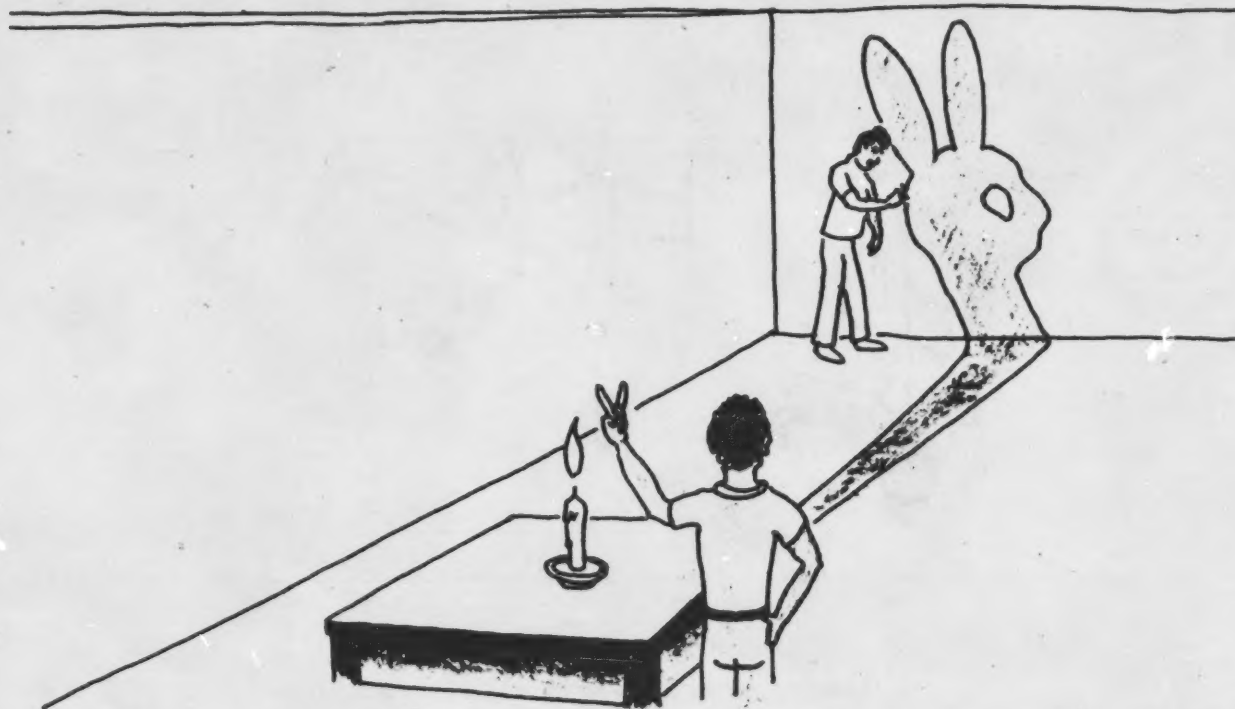
FIRST
ACTIVITY
FOR
SKILL D

Discuss with the students the seasons of the year. Ask questions such as: "¿Hace frío?" "¿Hace calor?" Let the students imagine that they are someplace in Connecticut. Do they observe any shadows? When do you see the most shadows? What things are necessary to produce a shadow? Let the students discuss this.

SECOND
ACTIVITY
FOR
SKILL D

Perform the following demonstration with the students. Light a candle (or any other source of light) and put an object in front of the source of light in order to produce a shadow. Ask a student to trace the shadow of the object on the wall, table or wherever the shadow is cast.

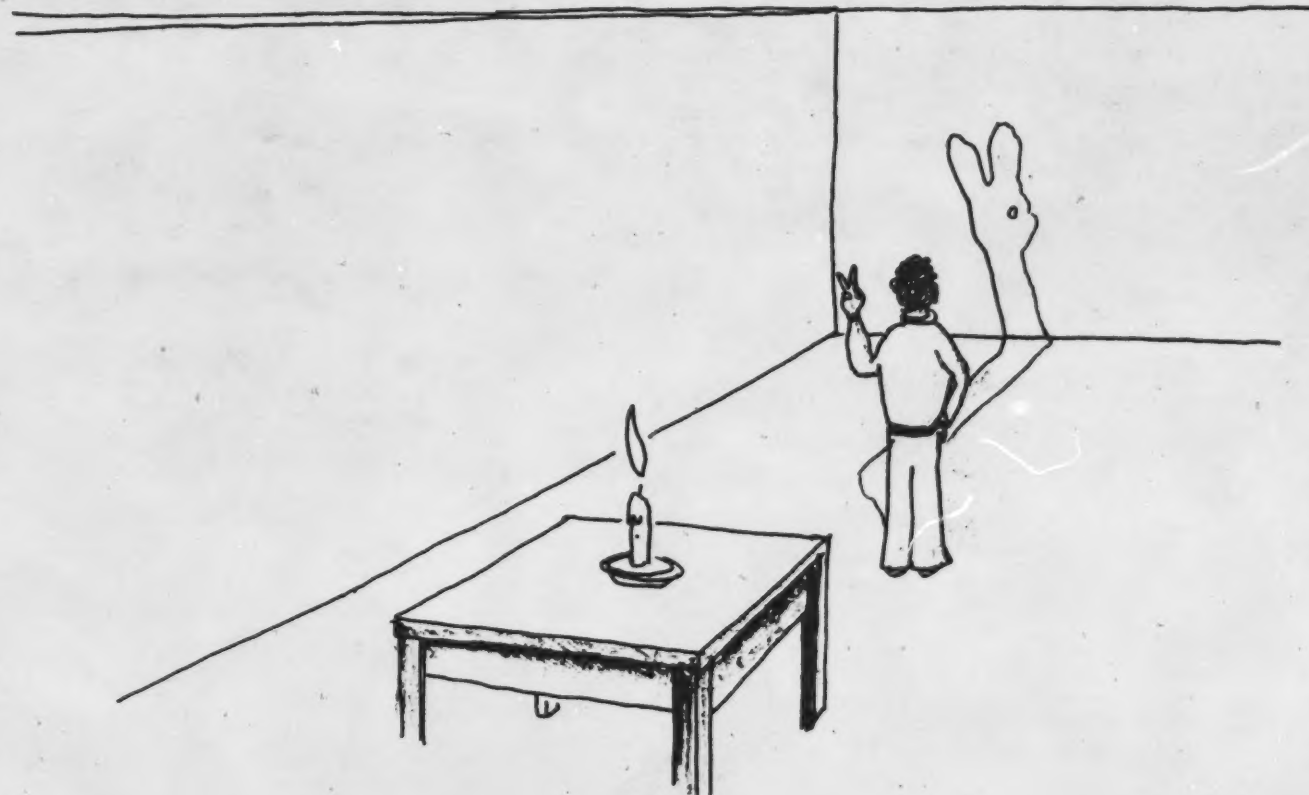




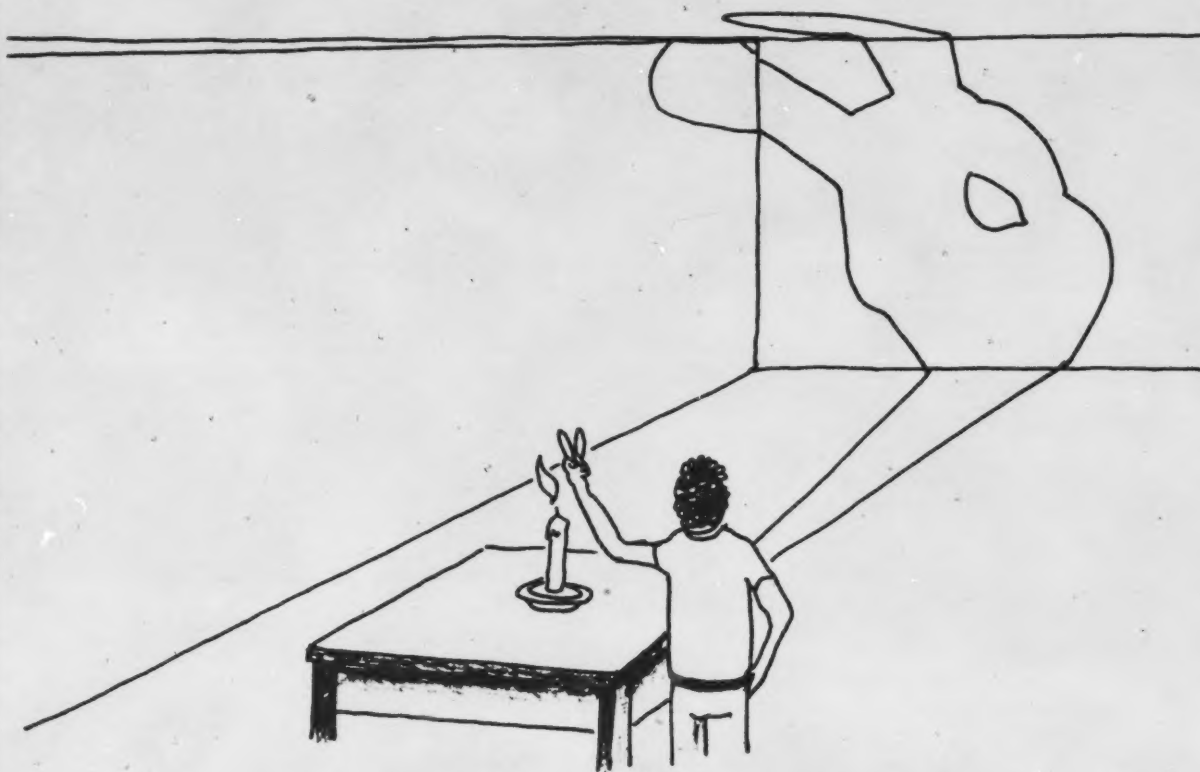
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Ask the students to observe what happens next.

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Move the object away from the candle. Does this action affect the shadow? How? Other students should trace the new shadow and compare the difference between the old and new shadow.



Move the object closer to the light source and note the difference in the shadow produced. Once again, the students should trace the shadow.

Blow out the candle and ask the students to compare the three different shadows that were produced by the different locations of the candle. How were the shadows alike? How were they different? What changes occurred in the shadow as the object was moved farther from or closer to the light source?

SCIENCE CURRICULUM FOR GRADE THREE

UNIT I: CONNECTICUT

THIRD
ACTIVITY
FOR
SKILL D

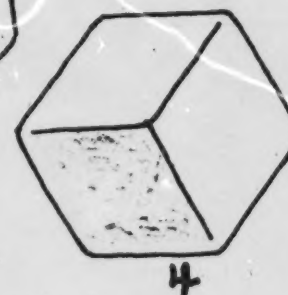
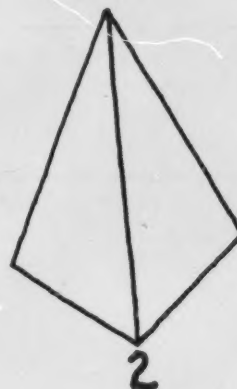
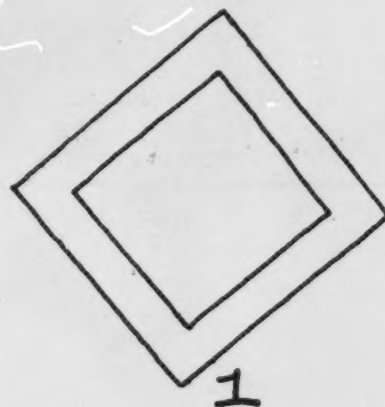
Put the candle and an object in the original position, but now move the candle away from or towards the stationary object. What changes can be observed in the shadow now? Is it larger or smaller?

FOURTH
ACTIVITY
FOR
SKILL D

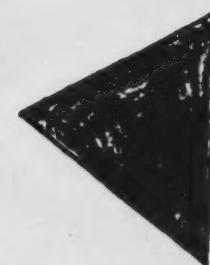
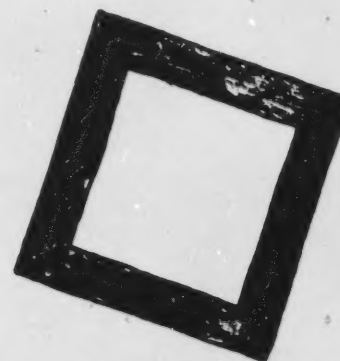
Distribute among the students three-dimensional objects of different geometric shapes. Let them observe the different shadows each shape produces.

Match each figure with the shadow which it produces. Each figure has a number. Underneath each shadow write the matching number.

OBJETOS



SOMBRAS



SCIENCE CURRICULUM FOR GRADE THREE

UNIT I: CONNECTICUT

SKILL E: To infer that the changes in the position of shadows caused by the sun depend upon the rotation of the earth.

VOCABULARY: rotation
day
night

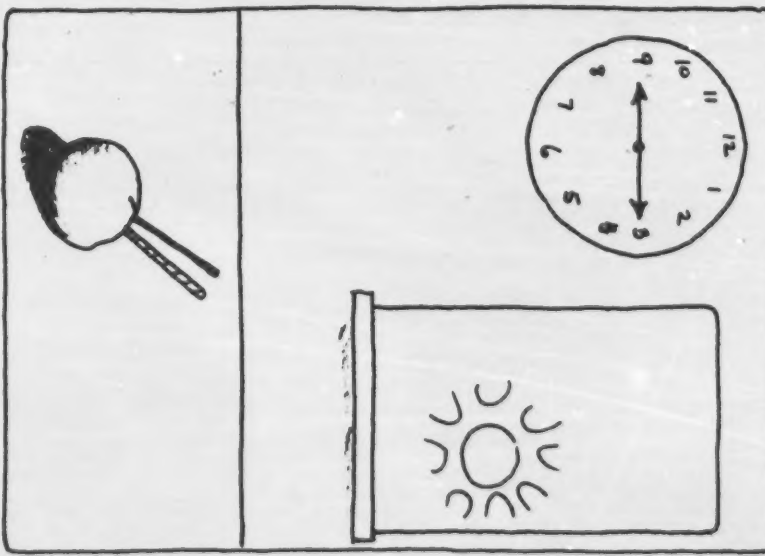
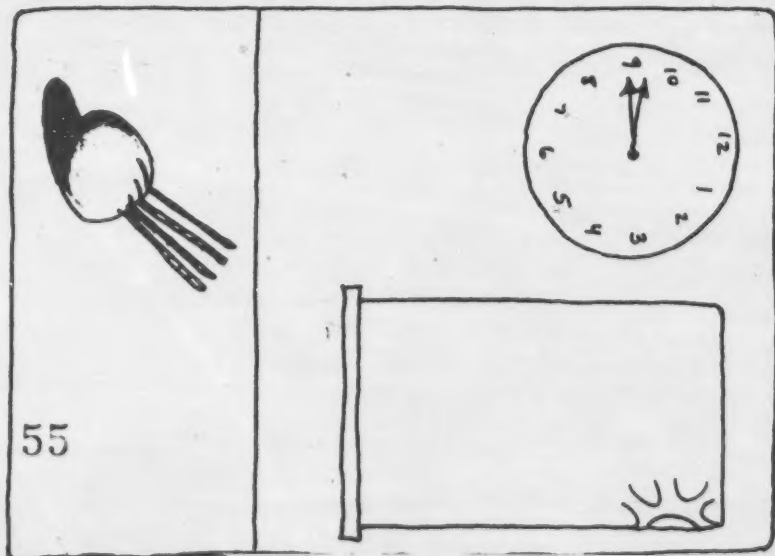
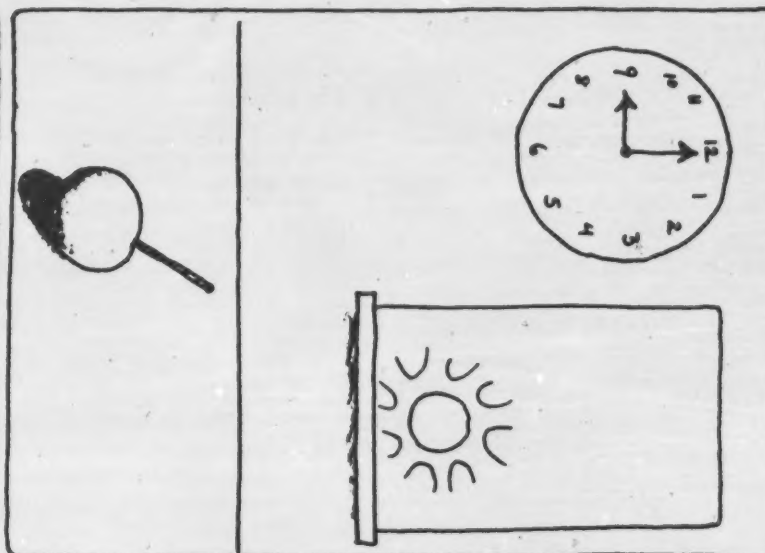
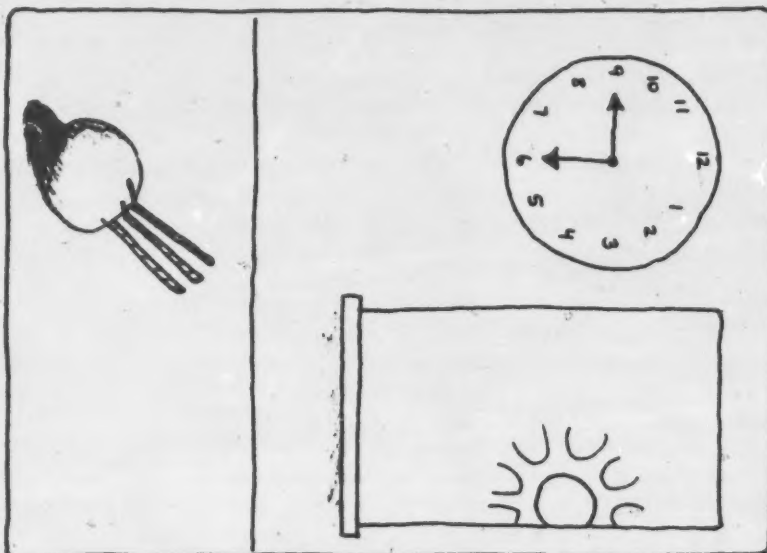
**FIRST
ACTIVITY
FOR
SKILL E**

Divide the class into groups and distribute to each group straws and plasticine. Ask the groups to make a ball out of plasticine, and to put it in a place where it will receive sunlight. Once they have placed the ball, they must not move it. They will now place one of the straws into the ball of plasticine so that the straw does not cast a shadow. The straw must point directly at the sun in order for this to occur.

Observe the straw every fifteen or twenty minutes. Ask, for example: ¿Qué notas? (Que el sorbeto proyecta sombra.) Place another straw in the clay so that this straw does not cast a shadow. Leave the first straw in its place. Do this at least four times. Remember: add a straw each time that they make an observation, but they must not move the previous ones.

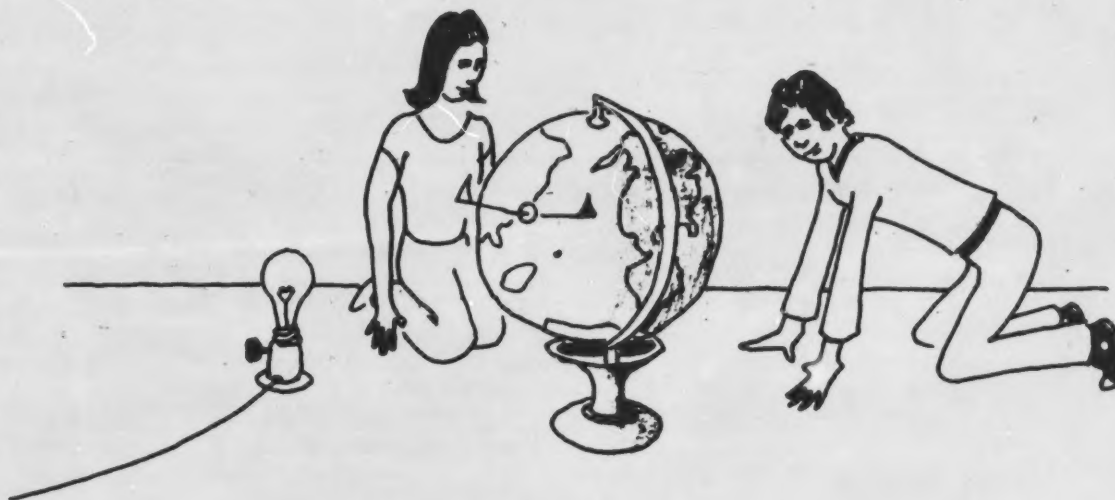
While the students do the exercise, ask them to describe what happens and what they observe about the position of the straws and of the sun. Help them by asking questions such as the following: ¿Qué tienes que hacer para lograr que cada sorbeto que introduces en la plasticina no proyecte una sombra? (Colocarla directamente hacia el sol.) ¿Por qué al cabo de un tiempo se proyecta una sombra? (Porque algo se movió) ¿Qué se movió? (Posiblemente le indiquen que fue el sol) The students will discover that for a straw not to cast a shadow, it must point directly at the sun, and that the reason that the straw casts a shadow later is due to movement. They will probably deduce that it was the sun that moved.

When they have finished the experiment, ask them to observe the position of the straws. With the following line of questioning lead them to the idea that it is really the earth, not the sun, that moves. ¿Cómo saben Uds. que el Sol se mueve? ¿Se mueve realmente el Sol? ¿No podría ser la Tierra? ¿No podrían ser ambos?



SECOND
ACTIVITY
FOR
SKILL E

Darken the classroom and then light a strong light. Bring a globe near to the light source. Ask, for example: ¿Qué observan en el globo? ¿Está todo el globo alumbrado? ¿Qué parte está en sombra? ¿Por qué? They will discover that only half the globe is lighted; the other half is in shadow. Bring to the globe a short pencil or any other suitable object. Position the pencil so that one tip touches the globe and the other tip protrudes from the globe. This will cast a shadow. Try to support with plasticine the object that you have chosen and rotate the globe slowly. Ask the students to observe carefully the change of position of the shadow. Remember that the light source must remain in a fixed position. Now ask: ¿Qué hace que la sombra cambie de posición? The students will have discovered that the rotation of the earth causes the changes in the shadow.



THIRD
ACTIVITY
FOR
SKILL E

Try this: Make a little flag with a matchstick and paper. Put a little plasticine around the bottom of the matchstick. Fasten this to the globe to show where you live. Use a lighted flashlight or electric light bulb in a small lamp base to represent the sun. Pull down the shades and turn off all other lights in the room. Hold the light bulb a few feet away from the globe.

- A. What part of the world has daylight? ¿En qué parte del mundo, más o menos, es de día?
- B. What part has darkness? ¿Qué parte del mundo está en la oscuridad?

Rotate the globe slowly. Watch the little flag that stands for the place where you live. ¿Qué pueden ustedes decir acerca de la sombra?

SCIENCE CURRICULUM FOR GRADE THREE

UNIT I: CONNECTICUT

SKILL F: Is able to identify some interdependency relationships between (among) the organisms of a community.

VOCABULARY: community
environment
interaction
interdependence

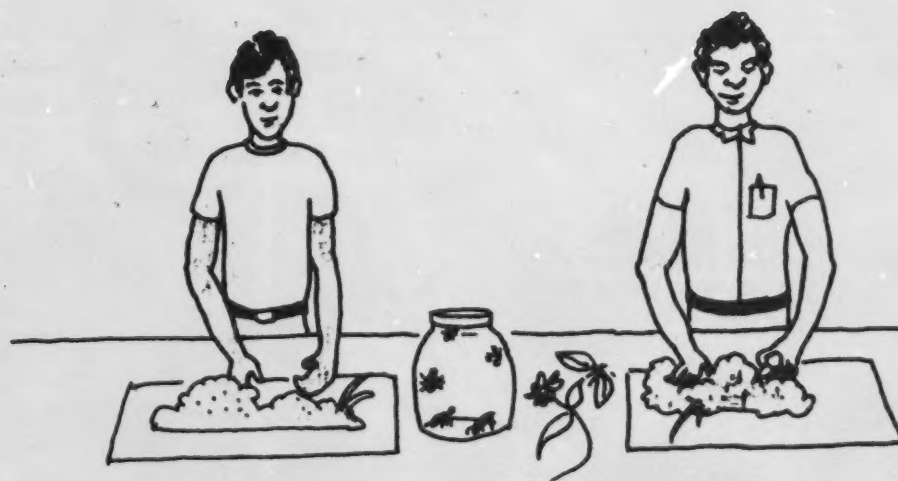
**FIRST
ACTIVITY
FOR
SKILL F**

Divide the class into small groups. Take them to the yard and, if possible, select an area where the vegetation is not high and the earth is humid and soft. Assign to each group an area. Instruct the students to measure a square approximately 30 cm. on each side. Each student should have a paper bag or a plastic bag, a coffee stirrer and a small shovel for removing dirt.

They will dig to a depth of approximately 8 to 10 cm. and will take out a piece of earth with grass. They will collect it in the paper bag and take it back to the classroom. They will place sheets of newspaper on the floor and will take out their earth samples. They will observe and identify the plants and animals contained in the sample. (Do not worry if they cannot identify all the organisms. Identify them with diagrams.) What organisms did they find? Which are plants? Which are animals? What are they like? Have the children compare the animals that they found on top of the earth with those that they found beneath the earth. Ask questions, such as: ¿Tienen el mismo color? ¿Tienen la misma forma? ¿Son las plantas parecidas; diferentes?



63



64

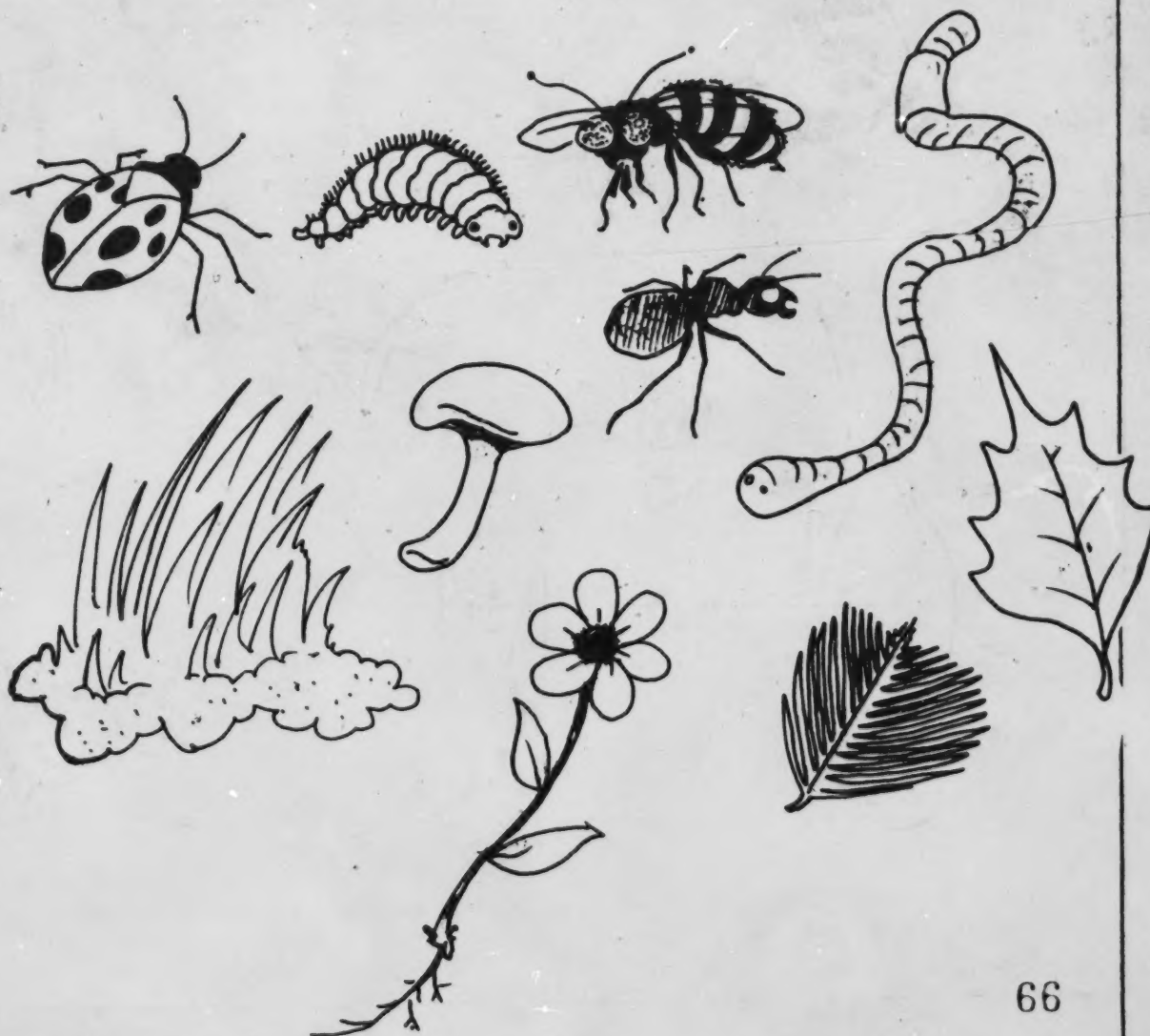
SCIENCE CURRICULUM FOR GRADE THREE

UNIT I: CONNECTICUT

SECOND
ACTIVITY
FOR
SKILL F

Write or draw on the blackboard the names of or pictures of the plants and the animals that they found. After you have written the names on the board, draw a line between two of the names that illustrate a possible interaction. When you do this, say aloud, for example: "The bee gets something from the plant." (What you do will help the child to visualize in graphic form the possible interaction that exists between the organisms found.)

Invite several students to draw other lines to suggest other interactions.



THIRD
ACTIVITY
FOR
SKILL F

Show the students an illustration such as the one below. Ask them to establish possible interactions. What feeds upon what?



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¿Qué se alimenta de qué?

SCIENCE CURRICULUM FOR GRADE THREE

UNIT I: CONNECTICUT

SKILL G: Is able to describe some characteristics of the soil.

VOCABULARY: particles
humidity

**FIRST
ACTIVITY
FOR
SKILL G**

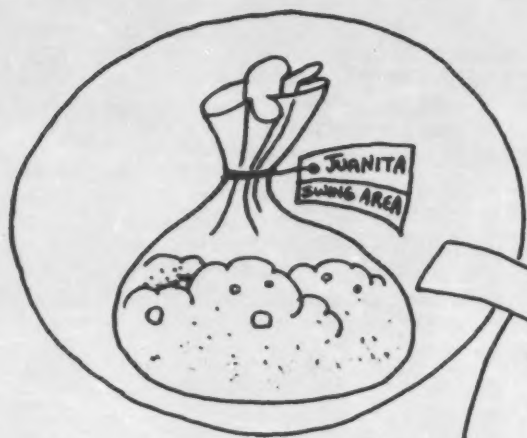
Take the students out to the schoolyard to observe the soil. They should observe whether the soil has vegetation, and decide whether the soil is rocky, sandy, etc.

Divide the class into groups. Assign different groups of students to different areas. There should be a note-taker in each group. Each area should have a different number. Use questions to direct the students' observations such as the following: ¿De qué color es el suelo? ¿Está húmedo? ¿Es un suelo seco? ¿Se ven algunos organismos? ¿Los conoces? ¿Qué otras cosas ves? Write down every time what they observe.

**SECOND
ACTIVITY
FOR
SKILL G**

Ask the students to collect a sample of the soil that they have observed. Have them put the sample in the plastic bag and label the bag with the number of the place where they collected it.

After returning to the classroom, ask the students to place the sample of soil on a piece of newspaper spread out on the floor. Ask them to take a small portion of the soil between their fingers. Elicit their observations and reactions with questions such as: ¿Cómo se siente entre los dedos? ¿Cómo es? ¿Es duro? ¿Es blando? ¿Es pegajoso? ¿Sienten como unos granitos? ¿Está húmedo o seco?



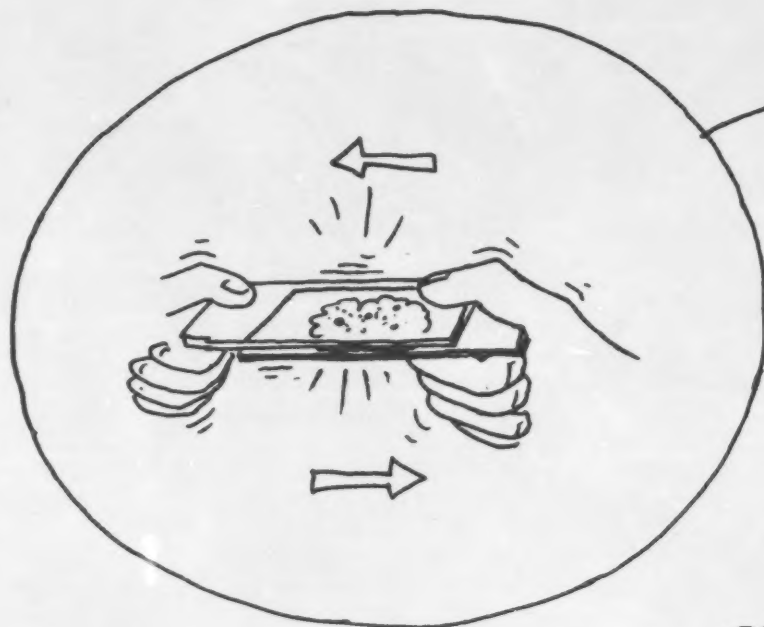
71

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THIRD
ACTIVITY
FOR
SKILL C

The students will place a sample of the soil between two glass slides or between two transparent plastic plates. They will scrape one slide over the other. Ask, for example: ¿Qué oyen? ¿Qué lo causó? They will discover that the slides will make noise, caused by particles of dirt. The students will then observe some of these particles with a magnifying glass.

Ask them to describe what they observe. Guide them with questions such as: ¿Son las partículas que observan del mismo tamaño? ¿Son todos las partículas que observan del mismo color? The students will note the varied sizes and color of the particles. They will describe the components of the soil according to what they have observed. The groups will compare the observations. Has each group observed the same thing? What differences have they found between one sample and another?



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FOURTH
ACTIVITY
FOR
SKILL G

Present the students with samples of different kinds of soil. Among the samples there should be differences in color, in the size of the particles, in the texture of the soil. The soil samples should be numbered. Ask them to observe the soil samples and allow them to use the magnifying glass. Guide their observations with questions, such as: ¿Cómo es la muestra de suelo que estás observando? ¿Tiene pedrecillas? ¿Son las pedrecillas grandes o pequeñas? ¿Es húmedo, seco, o borroso? ¿Qué color tiene? ¿En cuál de estas nuestras crecería mejor una planta? They will note the physical characteristics of the soil: whether it contains stones; whether the pebbles are large or small; whether it is moist, dry or clay; what color it is; which sample would be, in their opinion, most appropriate for growing plants.

SKILL H: Is able to infer the effect of various components of soil on the growth of a plant.

VOCABULARY: soil

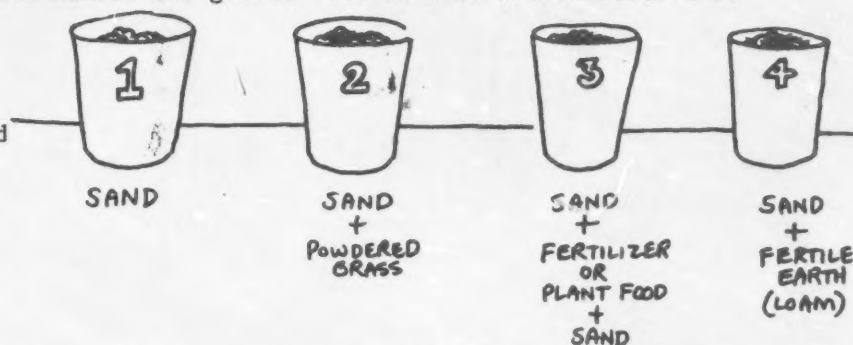
FIRST
ACTIVITY
FOR
SKILL H

Invite the students to go on an excursion to the schoolyard. Have them observe plants and animals. (Their color, size, where and how they grow) When they return to the classroom, they will describe the observed objects. Ask questions such as: ¿Cómo son las plantas que observaron? ¿Dónde crecen? ¿Qué necesitan para vivir? ¿Cómo son los animales que observaron? ¿Dónde viven? ¿Qué necesitan para vivir? Which are bushes? Which are trees? ¿Cuales son arbustos? ¿Cuáles son árboles?

SECOND
ACTIVITY
FOR
SKILL H

Invite the students to investigate the importance that soil has on living objects. Organize the class into groups and tell them they will do the following: they will collect sand in a glass or transparent plastic container. They will wash the sand several times with water from the faucet until the water comes out clear. The last time they wash the sand they will use distilled water in order to eliminate most of the substances which may serve as nutrients to plants. They will pour the sand on a sheet of newsprint and place it in the sun, if possible, until it dries. When the sand is clean and dry, they will select 4 styrofoam cups of the same size and make holes in the bottoms of them. They will number the glasses one to four and indicate what each one contains.

- cup number 1 - sand only
- cup number 2 - sand and powdered grass
- cup number 3 - sand with fertilizer or plant food
- cup number 4 - sand with fertile earth (loam)



The students will plant two radish seeds in each cup about 1 cm. deep. They will pour into each cup 2 spoonfuls of water. They will place the glasses in a bright, cool place and will observe them until the plants begin to show variations in growth. Guide the children's thinking about the experiment with questions, such as:

¿Por qué debemos echar diariamente la misma cantidad de agua a los cuatro vasos? ¿En qué vaso creen ustedes que crecerían mas rápidamente las semillas? ¿Por qué? Have the students keep a record of what they observe over a period of several weeks to compare the little plants in each cup, and establish the difference in the sand in the four cups. Elicit their conclusions, asking, for example: En su opinión, ¿qué debe tener el suelo para que los plantas crezcan saludables?

THIRD
ACTIVITY
FOR
SKILL H

Show pictures of foods that are produced in Connecticut. Ask questions which make the students aware of the relationship between the kind of soil and the food, plants, and animals produced, such as: ¿Dónde crecen las plantas que dan estos alimentos? ¿De qué se alimentan los animales que nos dan estos alimentos? ¿Cómo debe ser el suelo donde crecen estos animales? The students will write the names of four plants which grow where they live and they will name the foods which are obtained from those plants.



UNIT II: PUERTO RICO

- SKILL A: To point out the characteristics of the air.
- SKILL B: Is able to describe the effect of air pressure on different objects.
- SKILL C: Identifies changes in temperature utilizing the thermometer.
- SKILL D: To identify the organisms which live in an aquarium.
- SKILL E: Identify possible interrelationships between the organisms which live in a pond.
- SKILL F: Identify agricultural products from Puerto Rico and the weather and soil conditions necessary to produce them.
- SKILL G: To determine the weight of an object utilizing a spring scale.

SKILL A: To point out the characteristics of air.

VOCABULARY: air
weight
space
cold air
hot air

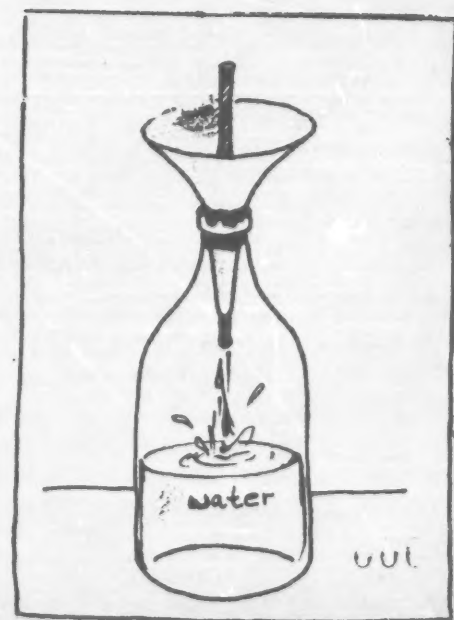
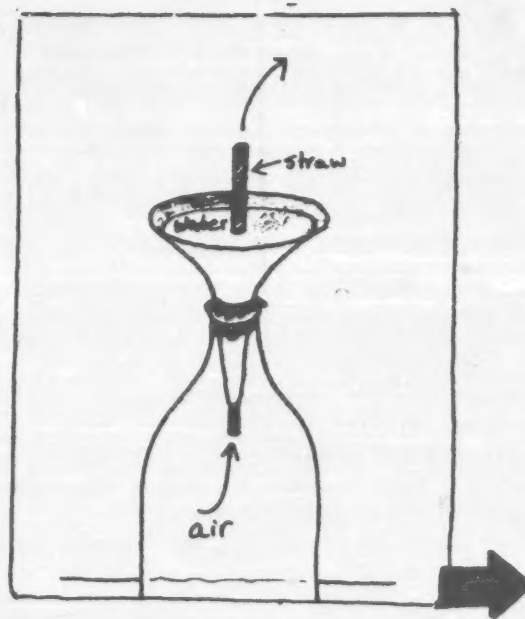
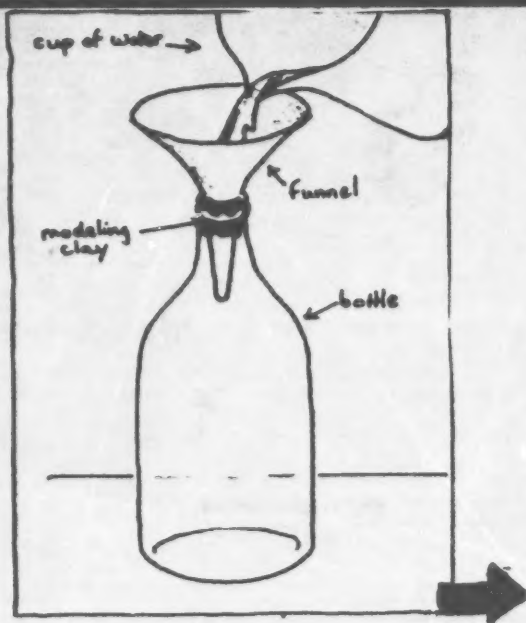
FIRST
ACTIVITY
FOR
SKILL A

Air occupies space:

Show an empty soda bottle to the students. Ask them whether or not the bottle is empty. You can prove that the bottle is really full. For this you will need a soda bottle, a small funnel, a straw, modeling clay, and a cupful of water.

Ordinarily, when you pour water into a bottle, the air in the bottle can escape through the neck. But prevent the air from getting out, and see what happens.

- a. Seal the funnel tightly into the neck of the bottle with modeling clay.
- b. Pour the cup of water into the funnel quickly. Why does the water stay in the funnel? Why doesn't the water go into the bottle? ¿Por qué se mantiene el agua en el embudo? ¿Por qué no cae agua en la botella? The water stays in the funnel because the air in the bottle cannot get out. Ask the students to suggest ways to fill the bottle.
- c. To fill the bottle with water, you must take out the air. This may be done with a straw. Pass the straw through the funnel into the bottle. Suck out a mouthful of air. Splash! Down goes some water, taking the place of the air you have removed. What did you take out when you sucked on the straw? Does it make a difference how much air you suck out? ¿Qué obtienes de la botella cuando halas con el sorbeto? ¿Hace alguna diferencia la cantidad de aire que sacas?



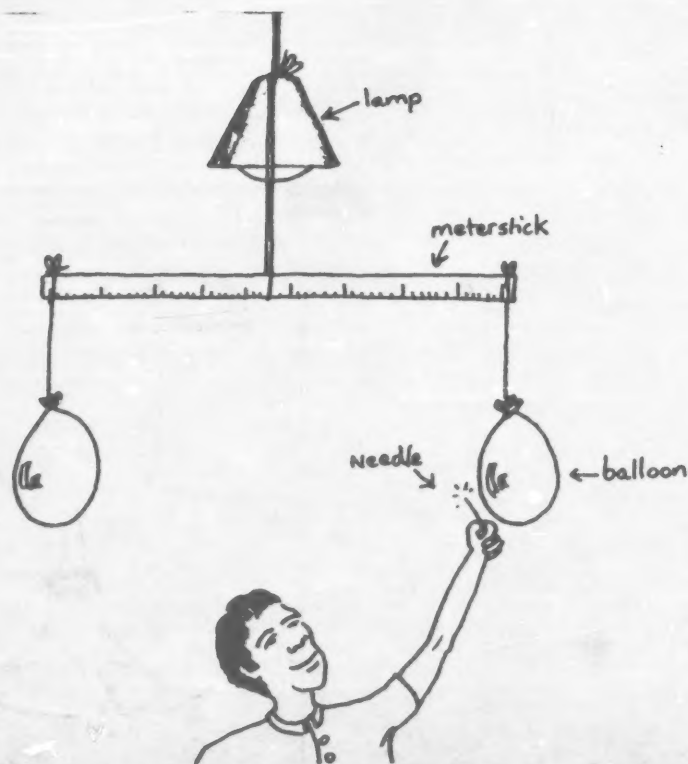
SECOND
ACTIVITY
FOR
SKILL A

Air has weight:

Materials for each group of students:

- 2 toy balloons
- A meterstick
- 2 meters of string

Show the above materials to the students and ask them to suggest ways to show that air has weight. Cut off two 50 cm (centimeters) of string from the long piece. Make a loop in the end of each. Now blow up the balloons to the same size and tie off their ends with the unlooped ends of string. Tie the remaining piece of string to the middle of the meterstick and hang the meterstick from a ceiling lamp, or some other suitable object, so that the meterstick hangs freely. Hang each balloon to a different end of the meterstick by the loops of string and adjust them so they balance the meterstick. When the meterstick has stopped swinging, break one of the balloons with a pin. The other balloon will swing downward. Since the balloons themselves weigh the same, there must be something on the side of the full balloon that pulls the meterstick down on that side. This something is the air in the balloon. What caused the meterstick to lose its balance? What was inside the balloon which made the balloon heavier? ¿Qué hace que la regla pierda el balance? ¿Qué hay dentro del globo que lo hace más pesado?



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SCIENCE CURRICULUM FOR GRADE THREE

UNIT II: PUERTO RICO

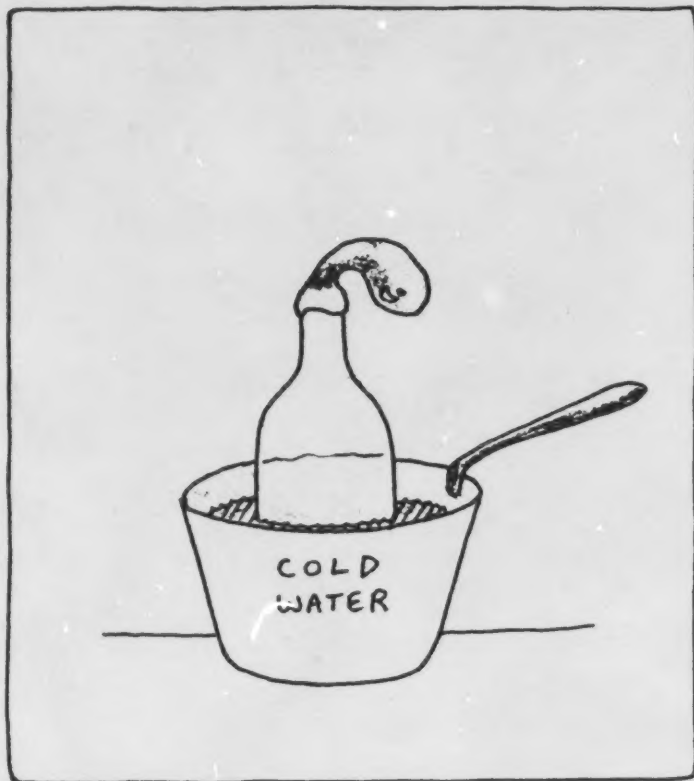
THIRD
ACTIVITY
FOR
SKILL A

This activity is almost the same as the one above. After you have balanced the balloons on the meterstick, tie an inflated balloon to one end and a similar balloon but not blown up to the other end. Is the meterstick still balanced? ¿Está la regla balanceada? Which end is heavier? ¿Qué lado es más pesado?

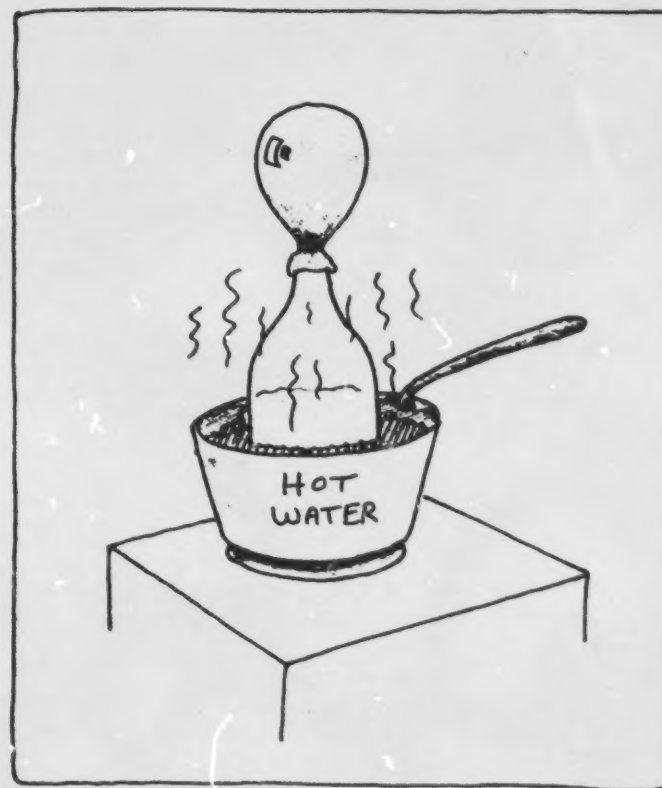
FOURTH
ACTIVITY
FOR
SKILL A

Fit the neck of a balloon over the mouth of a soda bottle. Set the bottle in a pot of cold water. Heat the water, and the air in the bottle will also be heated. The particles inside will then move around so fast that they bump and bump against the inside of the bottle and balloon. The glass can stand their pressure but the rubber balloon gives and stretches. With more room to move, the air particles can spread farther apart and so the air expands. As the bottle cools, the air particles within slow down. Then the balloon goes down, too.

Which type of air occupies more space? ¿Qué clase de aire ocupa más espacio? What would happen if we removed the bottle from the boiling pot and let the bottle cool? ¿Qué sucedería si quitáramos la botella del agua caliente y dejáramos que se enfriara?



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FIFTH
ACTIVITY
FOR
SKILL A

Give five balloons to each of two children. Give them each a box of the same size. Ask one of the students to inflate his balloons then secure them by tying off the ends. Now both students should try to fit their five balloons into their respective boxes. Which student's balloons fit the box better?



SKILL B: Is able to describe the effect of air pressure on different objects.

VOCABULARY: air pressure
work

SECOND
ACTIVITY
FOR
SKILL B

Put your finger over the top of a straw filled with water. Lift up finger. The water will not drip because your finger cuts off the air pressure on top while the air still presses up against the water at the bottom of the straw. Ask the class: ¿Por qué no sale del sorbeto el agua? ¿Que pasaría si mi dedo no estuviera allí (en el borde del sorbeto)? Take away your finger. ¿Por qué comenzó a gotear el agua tan pronto como mi dedo no estuvo en el borde del sorbeto? The air pressed down on the water and down it came.



SECOND
ACTIVITY
FOR
SKILL B

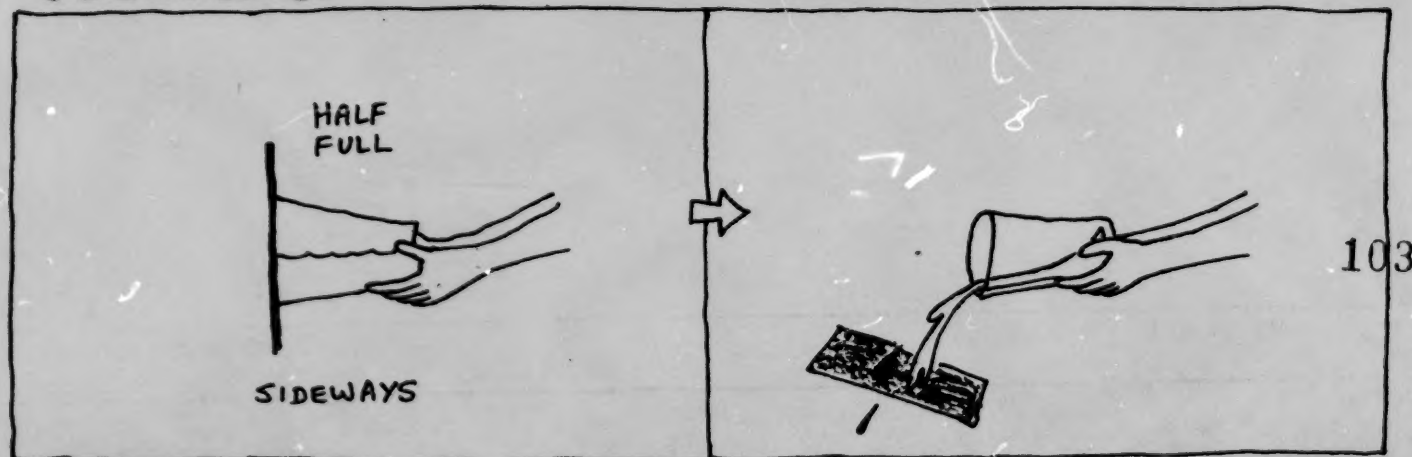
Fill a glass of water to the brim. Take a piece of thin, flat cardboard and hold it tightly over the mouth of the glass. Quickly turn the glass upside-down. Take your hand away from the cardboard. Ask the class: ¿Por qué no cae el cartón? ¿Por qué no lo empuja el agua? The cardboard stays in place because air pressing upwards holds it against the glass.

NOTE: The experiment will not work if water is not filled to the brim because the air in the glass and gravity will be making the water in the glass go downwards and this forces the cardboard to fall off. The experiment may not work if the cardboard used is too heavy. In that case, try to find a lighter piece of cardboard.

RIGHT



WRONG

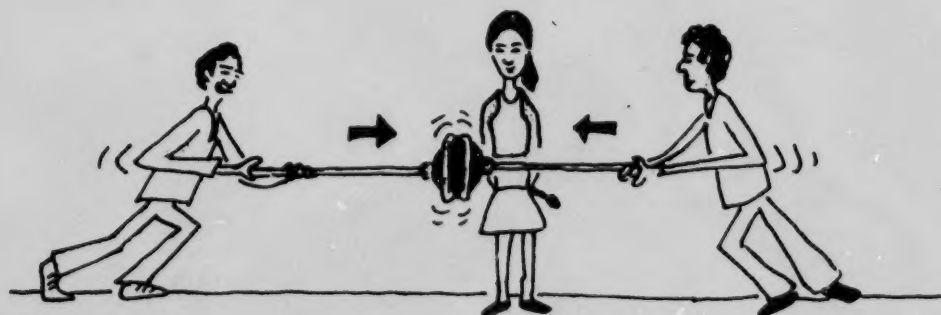


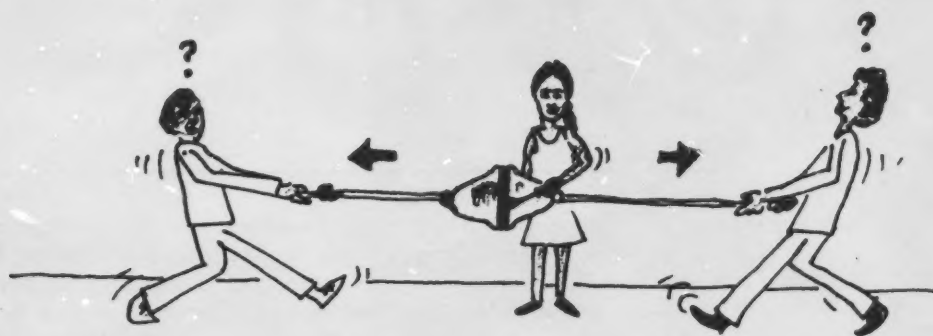
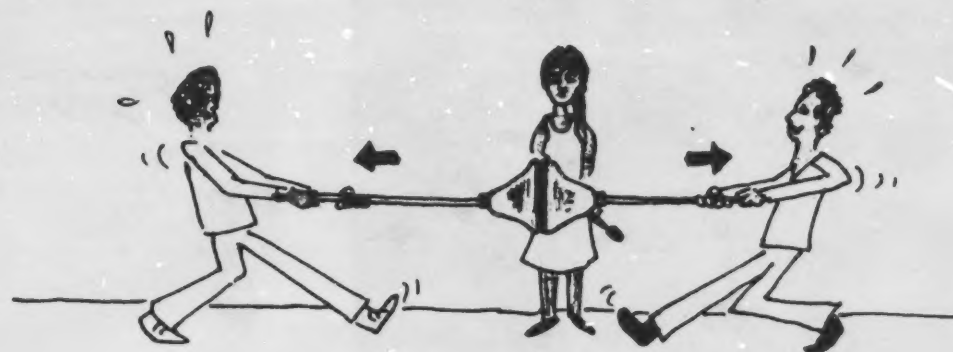
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THIRD
ACTIVITY
FOR
SKILL B

Clap two sink pads or plungers together so that they fit tightly. Ask a friend to pull on one while you pull the other. You cannot pull them apart. But, as soon as you let any air get between the pads or plungers, they separate. You can get air between the two plungers by wedging a tablespoon into the seam formed by the two plungers. A small amount of air between the two plungers will do the trick.





FOURTH
ACTIVITY
FOR
SKILL B

Make a list of tasks or jobs you can do using air pressure. Examples:

- a. in a gas station
- b. at a dentist's office
- c. at home

Discuss with the students how these tasks may be done by people in Puerto Rico. Ask:
¿Usan las gasolineras de Puerto Rico la presión del aire? ¿Cómo? ¿Has, en algún tiempo, ido con tus padres a una gasolinera para inflarlos neumáticos de tu carro? Y los neumáticos de tu bicicleta, ¿es necesario inflar los de vez en cuando? ¿Por qué es importante la presión del aire?

SKILL C: Identifies changes in temperature utilizing the thermometer.

VOCABULARY: temperature
thermometer
Celsius degree
Fahrenheit degree
fluctuate
fluctuations

BACKGROUND

There is a difference between weather and climate. Weather gives us the temperature and the meteorological conditions at a specific time. Climate, on the other hand, is the prevailing or average weather conditions of a place, as determined by the temperature and meteorological changes over a period of years. Climate usually affects the life style and activity of a place.

The climate of Puerto Rico is tropical except in the highest mountains where the climate may be classified as subtropical. Puerto Rico is in the path of the tradewinds which blow from the northeast and provide a moderate climate all year long. On the island there are no extreme temperature changes during the different seasons of the year. There never has been recorded a temperature above 39.4°C (103°F) nor below 3.9°C (39°F).

In spite of its small size, well-defined climatic regions which differ one from another, are distinguishable on the island. In the interior and in the higher regions, the temperatures are milder than in the coastal regions. The temperatures in the interior fluctuate between 20°C (68°F) and 23.3°C (74°F), while those of the coastal areas fluctuate between 31.7°C (89°F). Some average temperatures are:

PLACE		AVERAGE TEMPERATURE	
		C°	F°
Interior:	Aibonito	21.9	71.4
	Cidra	22.9	73.3
	Maricao	22.2	72.0
Coast:	San Juan	25.6	78.0
	Ponce	25.6	78.0
	Mayaguez	25.1	77.2

Point out to the students that scientists use a thermometer of a scale different from the one found in American and Puerto Rican homes. The thermometers used by scientists and many other peoples of the world are based on the Celsius scale where 0°C stands for the freezing temperature of water and 100°C represents the boiling point of water. The Celsius scale is a part of the Metric System. Generally, the numeral found in the Fahrenheit degree is much higher than the numeral found in the Celsius degree. For example, 0°C is the same as 32°F and 100°C is the same as 212°F .

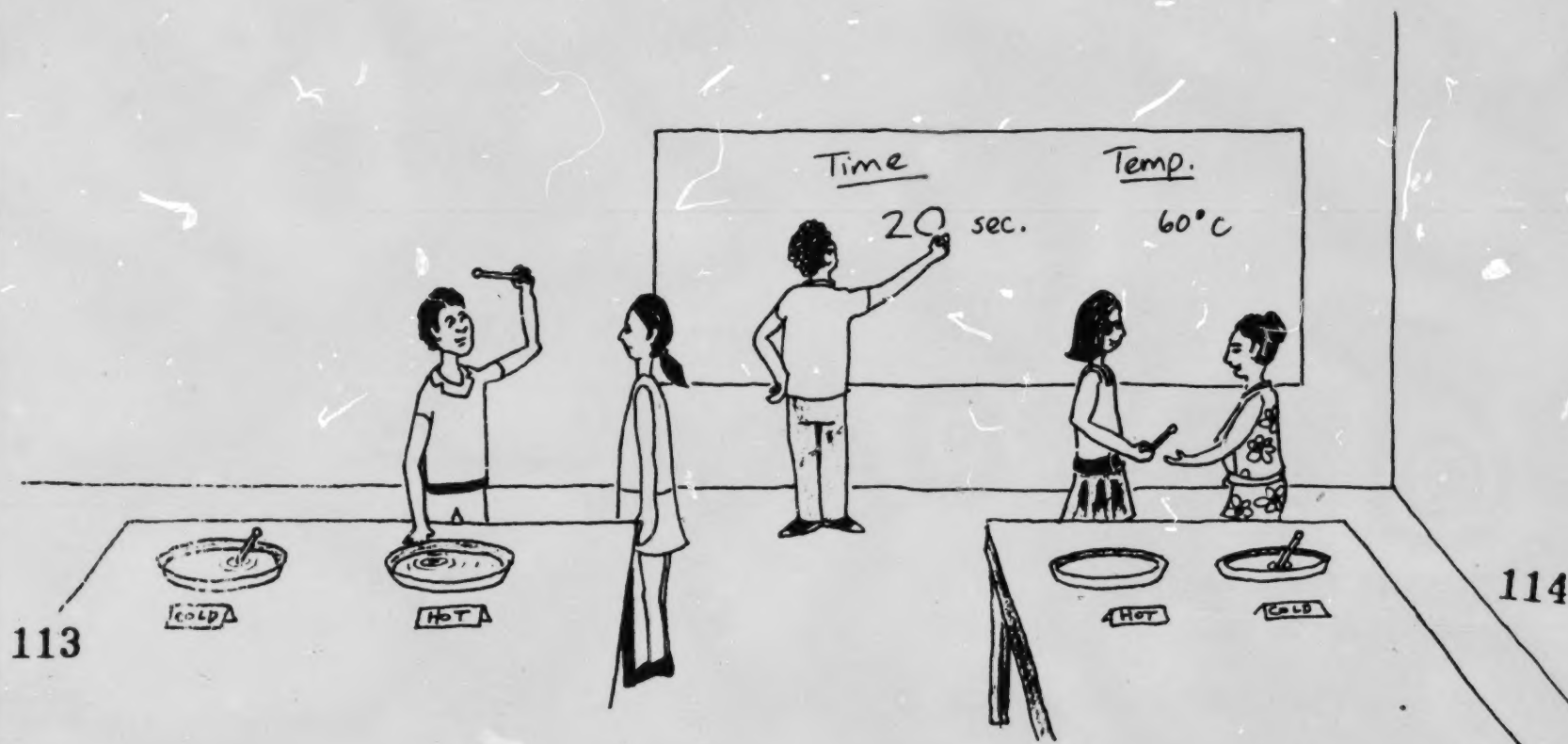
**FIRST
ACTIVITY
FOR
SKILL C**

Look for two pans of the same size. In one put warm water and in the other cold water. The students will touch the water with their fingers and describe the temperature of the water. Several students should do the above activity. Perhaps in the discussion, the children will have different opinions because the finger is not a good medium for measuring temperature. Do you see the need for a standard device to measure temperature?



SECOND
ACTIVITY
FOR
SKILL C

Repeat the above activity using a thermometer. Place a thermometer on Celsius Scale in each one of the pans. Let the thermometer be immersed for 20 seconds and observe what happens. Record the data on the blackboard. The students should exchange thermometers so that both groups can see the thermometer from the warm and cold water. Record the data on the board again. Repeat several times and ask: ¿A qué temperatura está cada recipiente? Repeat this activity several times and ask the students to give the temperature in each pan.



SCIENCE CURRICULUM FOR GRADE THREE

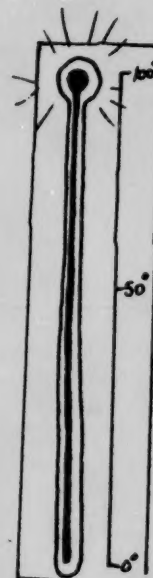
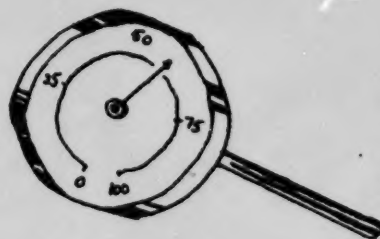
UNIT II: PUERTO RICO

THIRD
ACTIVITY
FOR
SKILL C

Look for information about temperature in Puerto Rico. Compare it with that of Connecticut, utilizing the thermometers found in the classroom, TV and radio weather announcements. Make sure that the comparisons are made on the same scale thermometer (Celsius or Fahrenheit).

FOURTH
ACTIVITY
FOR
SKILL C

Show pictures of thermometers which indicate variations in temperature for the students to name the temperatures. Ask the students to choose the highest and the lowest temperatures.



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FIFTH
ACTIVITY
FOR
SKILL C

To find out how much the temperature fluctuates in the classroom, have students measure the temperature at 9 AM, 12 noon, 2 PM for a week. Make a chart showing the highest and lowest temperatures. Compare these with the fluctuations found in the Puerto Rican coastal areas and Puerto Rican interior. What is the difference between the daily fluctuations and the weekly fluctuations? ¿Cuál es la diferencia entre la fluctuación diaria y la fluctuación semanal?

SCIENCE CURRICULUM FOR GRADE THREE

UNIT II: PUERTO RICO

SKILL D: To identify the organisms which live in an aquarium.

SKILL E: Identify possible interrelationships between the organisms which live in a pond.

VOCABULARY: pond
aquarium
organism
similarity
difference
interdependence

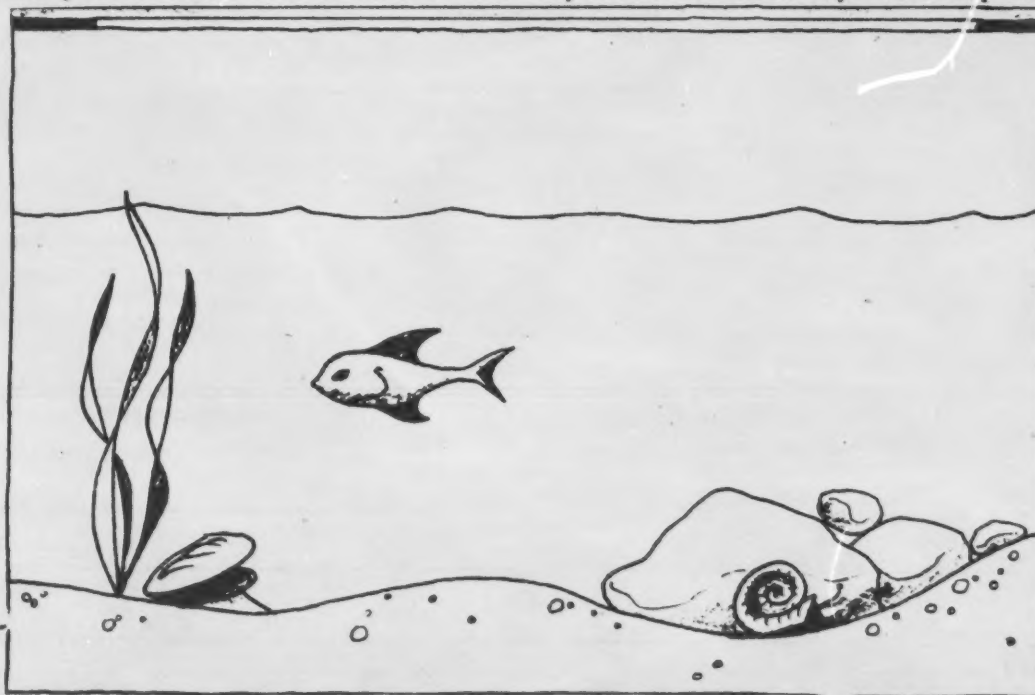
FIRST
ACTIVITY
FOR
SKILL D

Background: An aquarium is a simulated environment and may be duplicated identically in either Puerto Rico or Connecticut. A pond, on the other hand, is dependent upon the outside environment and is, therefore, climatically dependent.

Have a conversation about the organisms which the children have studied in class in the previous unit, i.e., those found in the soil. Ask: ¿Existen otros lugares donde hayan organismos? You may go on to say that in Puerto Rico organisms also exist in different places. Mention the places: earth and water. Thus, a great variety of aquatic organisms are found. Ask, for example: ¿Qué organismos pueden vivir en el agua?

SECOND
ACTIVITY
FOR
SKILL D

Create your own balanced community in an aquarium by using a one or two gallon jar with large surface areas for gases to enter and leave or a glass tank with a metal frame. Avoid using containers with metal which would come into contact with the water since some metals are poisonous to aquatic systems. Besides the tank, you will need: a glass lid, cork, clean sand, several water plants, snails, and perhaps a flat rock. Estimate one gallon of water for each three cm fish. (Do not include tails when measuring fish.) Clean the aquarium and put in three to five centimeters of sand. Press the water plants into the sand and arrange the rocks to one side. (Since chlorine is often added to drinking water let water from the tap set overnight before using so that chlorine gas might escape. Chlorine might be harmful to some organisms.) Pour unchlorinated water over the rock carefully so as not to disturb the sand and plants. The water should come to about two inches from the top of the aquarium. Set the aquarium in a light spot (not in direct sunlight, though) and give the plants about a week to take root. Now add fish and snails. Cover the aquarium with a glass lid resting on pieces of cork or padding so air can get in. (If available, an air pump and a water filter may be used.) Your little community should be able to survive for many months without any more help from you.



SCIENCE CURRICULUM FOR GRADE THREE

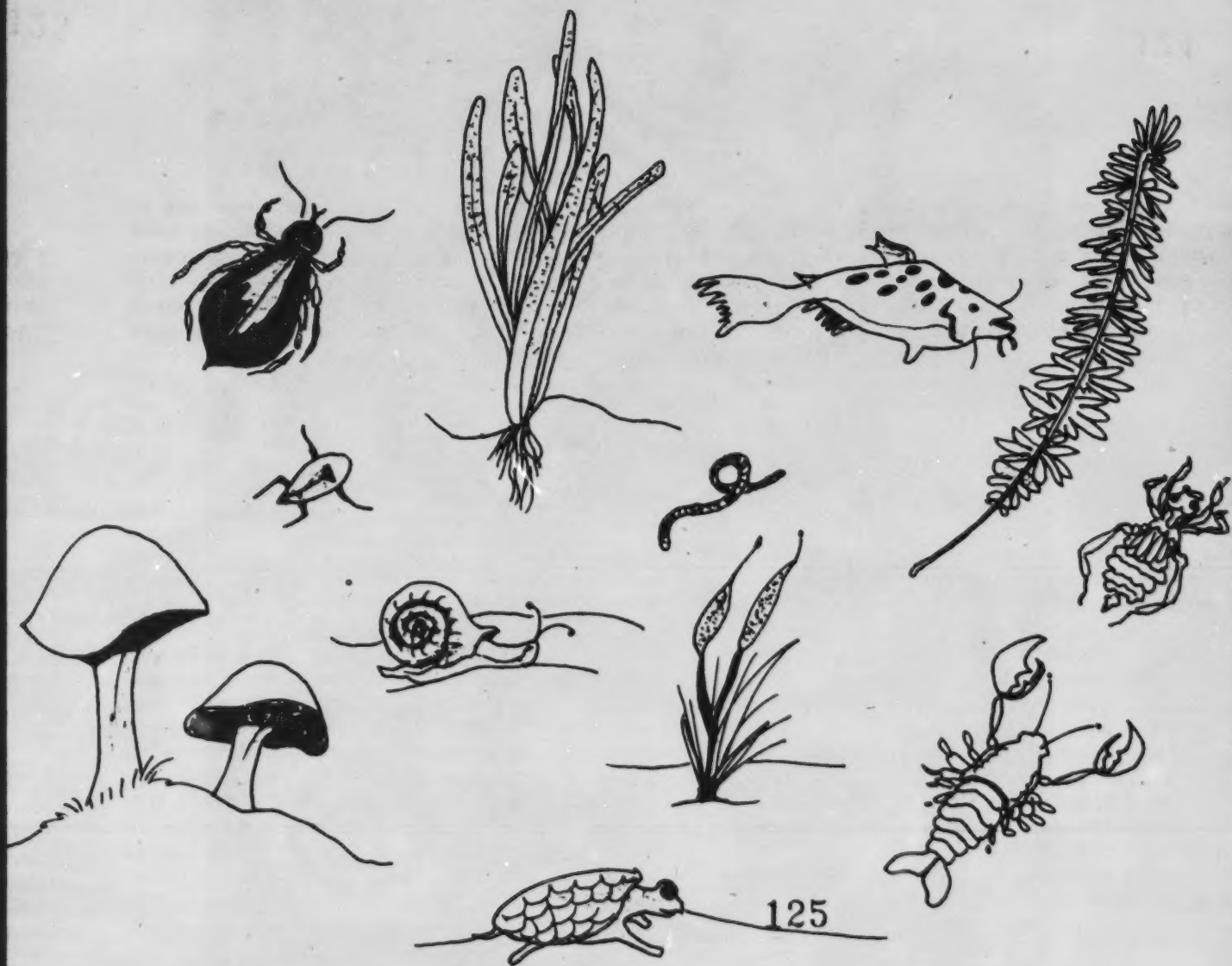
UNIT II: PUERTO RICO

THIRD
ACTIVITY
FOR
SKILL D

Invite the students to observe the artificial pond or aquarium which has been prepared for this lesson. Direct their attention toward the organisms which live in the pond with questions, such as: ¿Cómo se mueven los peces? ¿los caracoles? ¿Puede un pez vivir si se deja fuera del agua? ¿Por qué? ¿Qué estructuras tienen los animales del acuario que les permiten vivir en el agua? ¿Qué color tienen los organismos? ¿Para qué le sirve el color? Ask a student to catch a fish so that everyone can observe it with the magnifying glass. Put it on a wet paper. Let them observe the head and sides of the head. Elicit their observations: ¿Qué observan? (Tiene unas hendiduras y debajo están los branquios). ¿Para qué serán esas estructuras? ¿Cómo es el cuerpo del pez? ¿Para qué usa el pez las escamas? Ask them to return the fish to the aquarium. Continue asking: ¿Qué otros objetos vivientes hay en el acuario? ¿De qué se alimentan? ¿De qué se alimentan las plantas? ¿Tienen raíces? ¿Tienen hojas y tallos? Si echáramos peces más grandes en el acuario, ¿qué le podría ocurrir a los peces pequeños? Si echáramos muchos animales y pocas plantas, ¿qué pasaría? ¿Se afectaría el alimento de los animales en el acuario? ¿Por qué? ¿Podrían moverse libremente con facilidad los animales?

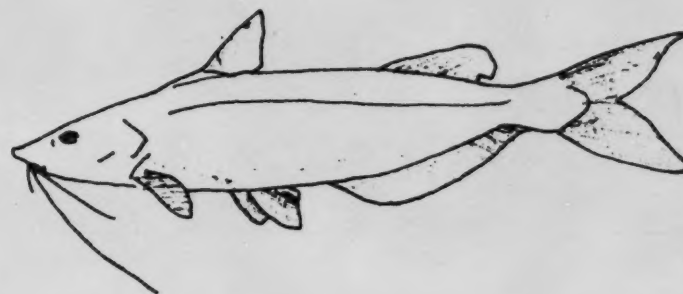
FIRST
ACTIVITY
FOR
SKILL E

With the students prepare a poster in which are included all the animals and plants shown in the pond reproduced in the classroom. Point out that the pond environment, in this case, includes the immediate land areas surrounding the pond since some organisms crawl out of the pond in search of food. Discuss how they are provided with food. Connect the organisms with their food sources. Do this by drawing an arrow from one organism to the one which it uses as food. For example, a fish might use a waterbug as food.



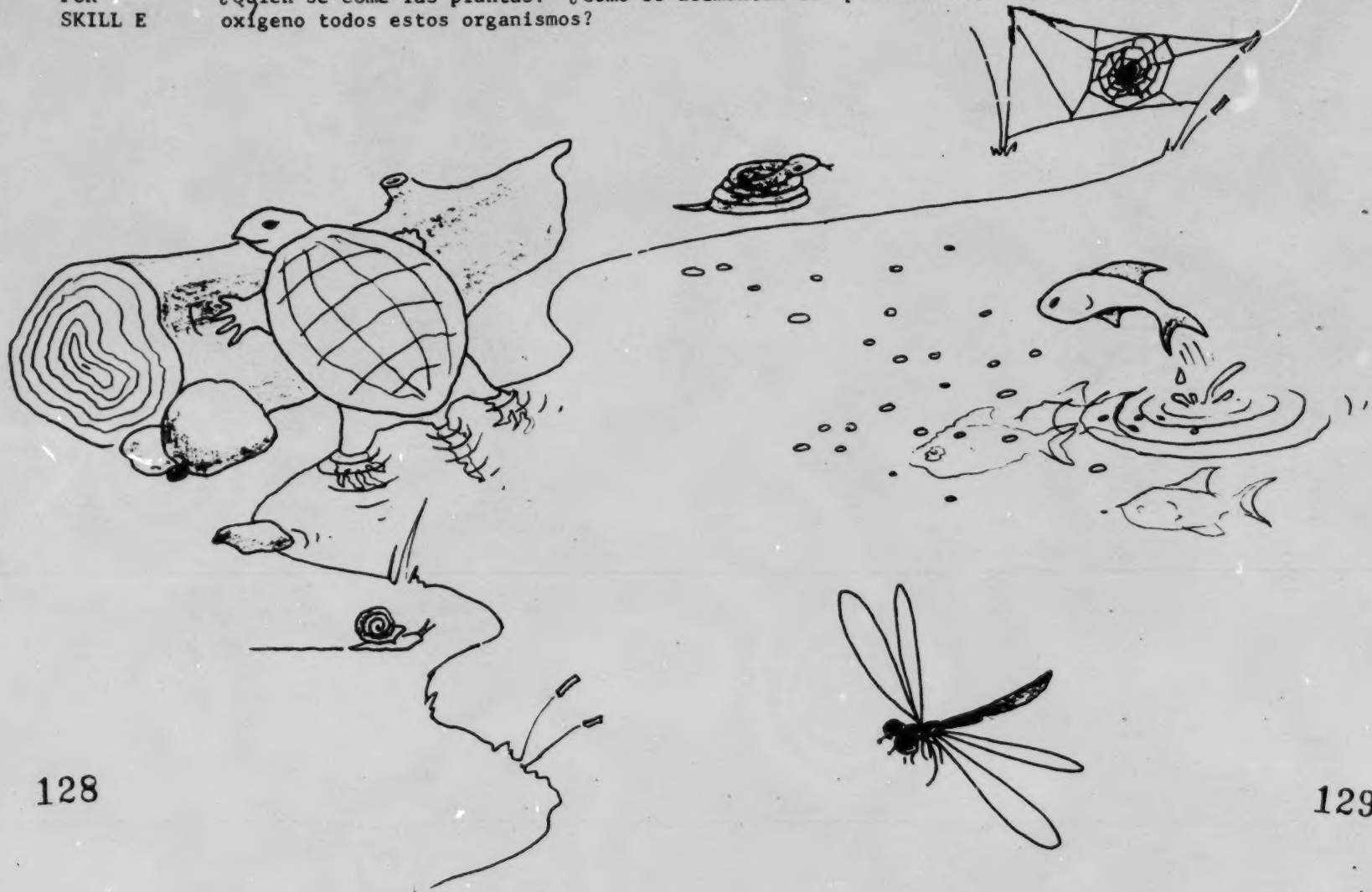
SECOND
ACTIVITY
FOR
SKILL E

Show a series of pictures of different kinds of organisms, some which belong to the pond and others which live on land. Ask the students to tell which ones are the inhabitants of the pond. Ask: ¿Cómo se distinguen? They should mention the characteristics which enable the animals to live in water.



THIRD
ACTIVITY
FOR
SKILL E

Show the students algae (plants), fish (large or small), dragon flies, snails, water turtle and other creatures of a pond. Ask the following: ¿De qué se alimentan estos animales? ¿Quién se come las plantas? ¿Cómo se alimentan las plantas? ¿De dónde obtienen el oxígeno todos estos organismos?



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FOURTH
• ACTIVITY
FOR
SKILL E

Discuss with the children the differences between a pond in Puerto Rico and a pond in Connecticut. Emphasize the different climates in Connecticut. "¿Qué le sucede a la plantas en el invierno?"

SKILL F: Identify agricultural products from Puerto Rico and the weather and soil conditions necessary to produce them.

VOCABULARY: soil
products
temperature

**FIRST
ACTIVITY
FOR
SKILL F**

Raise the question: ¿De dónde obtienes tus alimentos? The pupils will begin to see that they are shipped from gardens, farms, orchards, wheat fields, and ranches, but the intermediate question of where the foods in the supermarket come from may need to be explored: ¿Qué condiciones son necesarias en el terreno donde se producen? Air, water, and soil may be mentioned. ¿Es todo esto importante para cultivar plantas? Encourage discussion of whether soil is alike or whether some kinds of soil are better than others. ¿Puede un tipo de suelo producir toda clase de plantas? Recall the experiment with soil from Unit I., Skill G.

SCIENCE CURRICULUM FOR GRADE THREE

UNIT II: PUERTO RICO

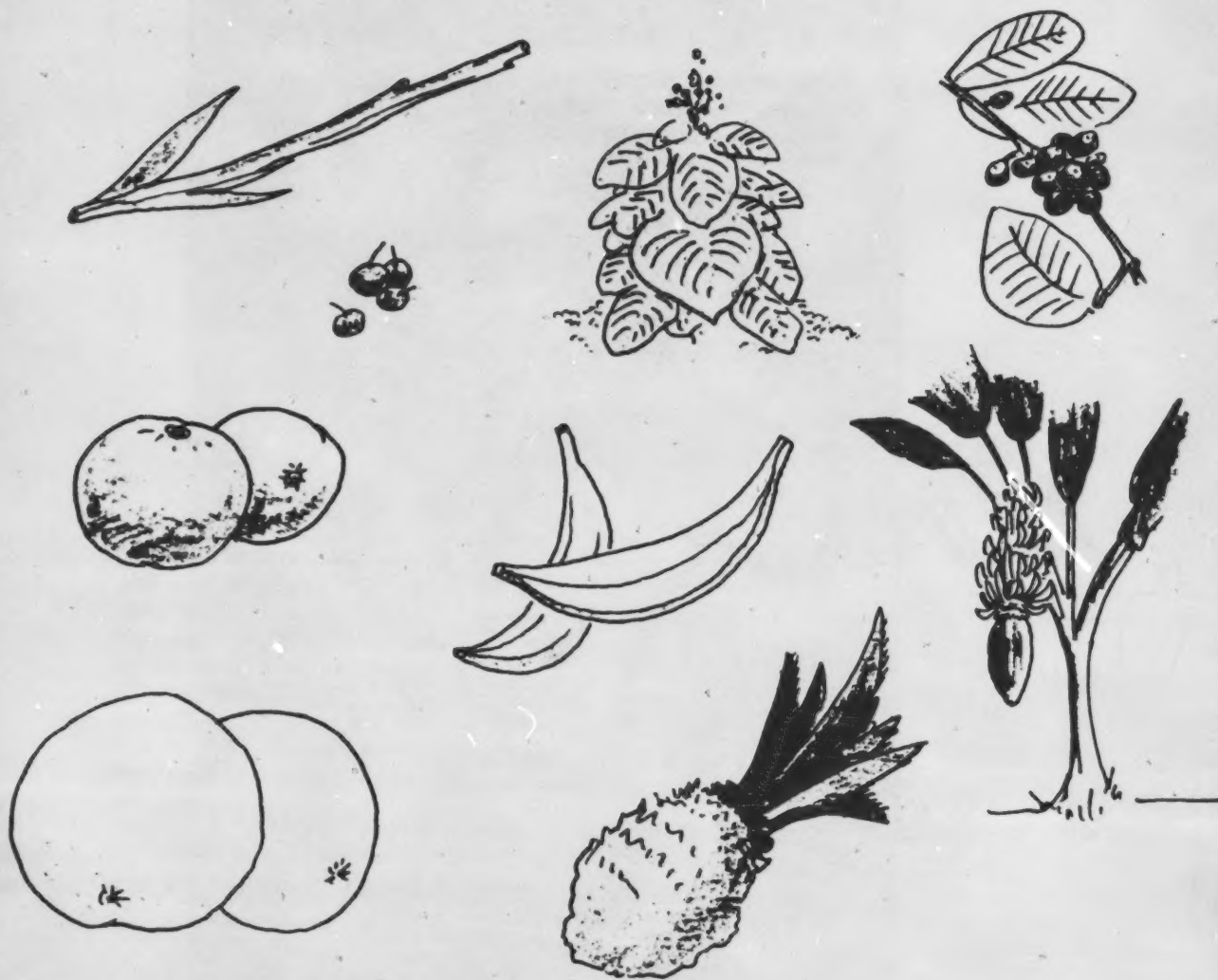
SECOND
ACTIVITY
FOR
SKILL F

Ask the students to bring cans, cartons, and wrappers from common foods to the class. As the children examine them, ask the following questions: ¿De dónde vienen estos productos antes de llegar al supermercado? ¿Se producen en Puerto Rico los mismos alimentos que en Connecticut? ¿Por qué? ¿Cuáles son los productos principales que se cosechan en Puerto Rico?



Write a list of these products:

1. caña de azucar
2. tabaco
3. café
4. frutos menores
 - a. china - oranges
 - b. guineos - banana
 - c. plátanos - plantain
 - d. toronja - grapefruit
 - e. piñas - pineapple



THIRD
ACTIVITY
FOR
SKILL F

Write a list of products. The children will identify if it is from Connecticut, Puerto Rico, or both. For example, apples, blueberries, strawberries, cabbage, tomatoes, bananas, oranges, lemons, limes, tobacco, lettuce, etc. Discuss the conditions necessary to grow these products.

Product	Place of Origin	
	P. R.	Conn.
Apples 		☒
Blueberries 		☒
Tomatoes 	☒	☒
Coffee 	☒	
Sugar Cane 	☒	

SKILL G: To determine the weight of an object utilizing a spring scale.

VOCABULARY: weight
spring scale
force of gravity

**FIRST
ACTIVITY
FOR
SKILL G**

Prepare an exhibit of products which are produced in Puerto Rico: coffee, sugar, pineapple, mango, orange, grapefruit, etc. Identify each one of the products.

Call two students to the front of the room. Ask them to extend their arms with their hands palms up and to close their eyes. Place a pineapple in one hand of a student and an orange in the other hand. Ask: ¿Cuál de los dos objetos crees que pesa más? ¿Qué sucedió con tu mano cuando se colocaron las frutas? ¿Por qué? ¿Hacia donde se movió tu mano? Repeat the same activity with the other student. Ask the class: ¿Cómo podríamos saber cuánto pesan algunas cosas?



SCIENCE CURRICULUM FOR GRADE THREE

UNIT II: PUERTO RICO

SECOND
ACTIVITY
FOR
SKILL G

Suggest that they use a spring scale to determine the weight of some objects. Ask them: ¿Cómo la podríamos hacer? A spring scale is a scale which moves up and down depending upon the force exerted upon the spring. In this case the spring is the rubber bands and the force is the force of gravity. The greater the force of gravity upon an object and subsequently upon the spring (rubber bands), the heavier the object is said to be. The children may build this scale themselves. Suggest the following way of making a spring scale. They will need a plastic or paper or styrofoam cup, rubber bands, marbles, and a nail.

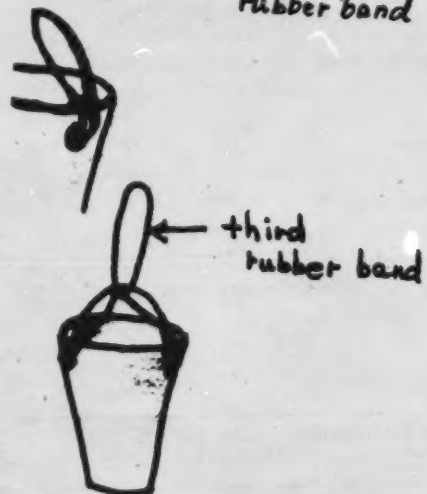
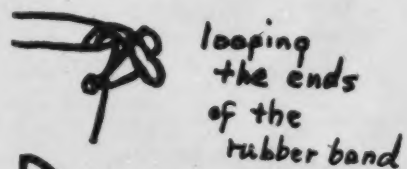
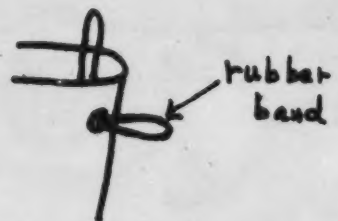
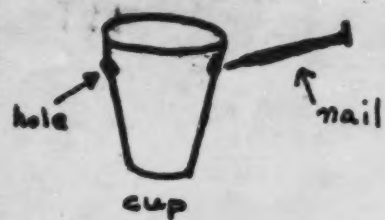
Using a pencil or a nail, puncture two holes opposite each other near the rim of the cup. Insert a rubber band into each of the holes. Loop the ends of each rubber band. Using a third rubber band, loop the first two together. (See picture.) They may lengthen their scale by looping another rubber band to the third rubber band. Place a sheet of paper lengthwise on the wall. Put a nail near the top and hang the newly made "scale" on the nail.

Place a marble in the cup. They will observe how much the cup goes down. They will mark on the paper the point the top of the cup reaches. They will put in another marble and observe how much the cup goes down. They will again mark that point on the paper. Thus, successively, they will put in the marbles one by one and each time that they add a marble they will mark it with paint. When they get to 10 marbles, they will take the marbles out of the cup. What happens?

They will draw a horizontal line from one edge of the paper to where they marked the points. They will write a numeral at each point according to the number of marbles. Ask the students to look for things whose weight can be determined using the scale they made. Ask them: ¿Qué unidad de peso estás usando? (La canica)

NOTE:

New rubber bands should be used for this activity as the elasticity of worn rubber bands may be poor.

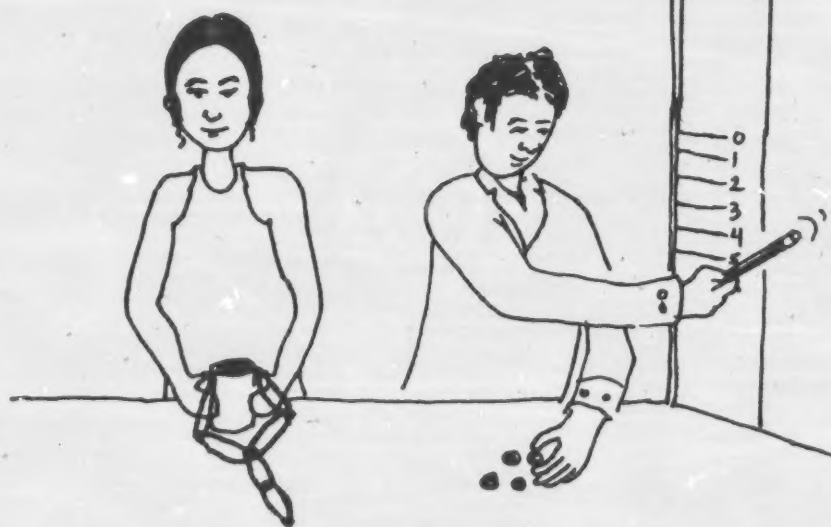


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THIRD
ACTIVITY
FOR
SKILL G

Using this scale, have the students check the weight of paper clips, seeds, screws, pencils, etc. The students will determine how many marbles each object weighs.

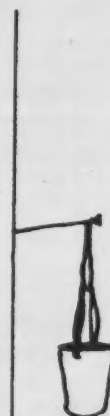




FOURTH
ACTIVITY
FOR
SKILL G

The teacher should show the following picture (or something similar) to the children and ask them to indicate which of the objects probably weighs the most and how they can find out how much the heaviest object weighs. ¿Cómo podrías saber cuánto pesa el objeto más pesado?

¿Qué objeto pesa más?



UNIT III: LATIN AMERICA

- SKILL A: Is able to infer that the changes in the position of the shadows produced by the sun are due to the rotation of the earth.
- SKILL B: Is able to discover that energy stored in still water can be released and used when the water is made to move.
- SKILL C: Is aware of the fact that a pulley can change the direction of the force needed to move an object.
- SKILL D: Is able to find out which kinds of material conserve the most heat; e.g. cotton, wool, or leather.
- SKILL E: Is able to understand how cotton thread is made.
- SKILL F: Is able to find out the relative hardness of different woods.

SCIENCE CURRICULUM FOR GRADE THREE

UNIT III: LATIN AMERICA

SKILL A: Is able to infer that the changes in the position of the shadows produced by the sun are due to the rotation of the earth.

VOCABULARY: sundial
shadow
earth's motion

BACKGROUND

Central or Middle America is really part of the continent of North America. It gets its name because it is in the middle, between South America and the United States. Latin America is made up of those lands in Central America and South America.

The Mayas lived long ago in Central America. Long before any European explorers had visited the New World, there existed Mayan cities in Central America. Today, although the Mayan Empire no longer exists, the ruins of the Mayan cities remain. These ruins tell a great deal about the Mayan people and their civilization.

The Mayas built their first cities in what we know today as Guatemala. As the civilization grew, the Mayas expanded and settled in what is now Yucatán, Mexico.

The Mayas acquired a great deal of knowledge. They understood the movements of the sun and other stars. From their understanding, they devised an accurate calendar.



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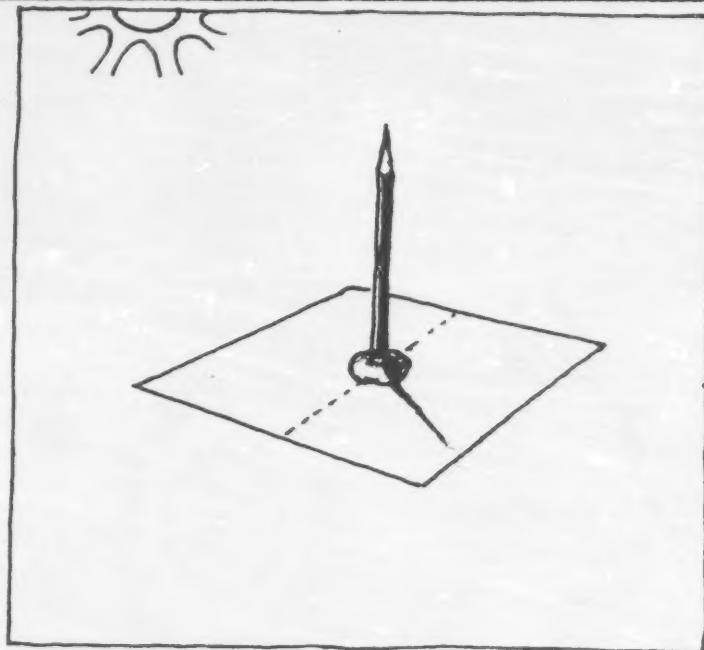
75.



FIRST
ACTIVITY
FOR
SKILL A

Discuss with the students the most ancient inhabitants of Central America, the Mayas. Locate on the map the places where they established themselves. Ask: Si estas personas no tenían ni reloj ni calendario, ¿cómo tú crees que ellos sabían cuando cosechar sus productos? (Se dejaban llevar por la observación del sol.) Tell the class that as a result, the Mayas constructed an instrument called a sundial. Ancient civilizations used the sundial to tell time utilizing the movement of the earth around the sun.

76.

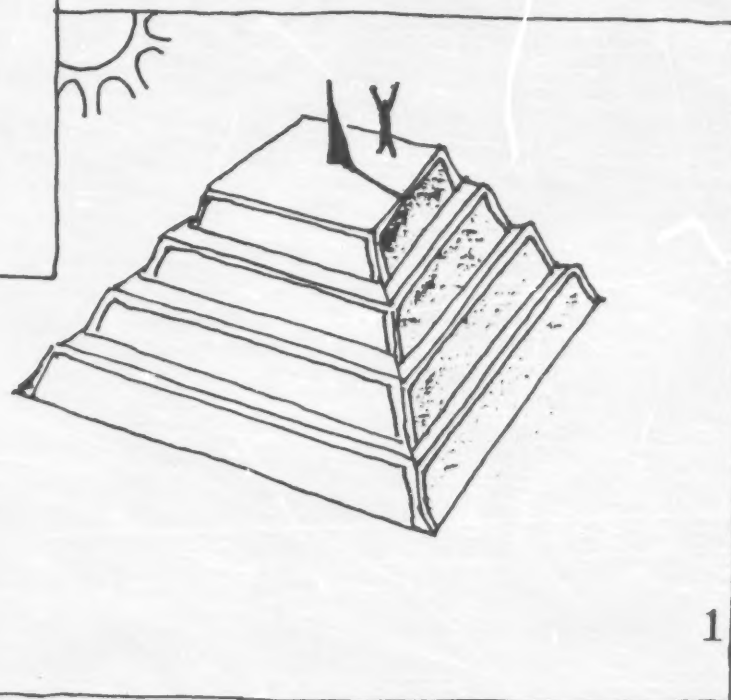
HOW TO CONSTRUCT A SUNDIAL

Materials you will need:

- a piece of cardboard about 15cm x 22cm
- a small piece of modeling clay
- a pencil about 18 cm long
- a triangle or carpenter's square
- a magnetic compass

Following these directions, construct a sundial:

Draw a straight line which goes through the middle of the board and which is parallel to one side. In the middle of this line, place the piece of modeling clay. Push the blunt end of the pencil into the clay so that the pencil is perpendicular to the board. To do this, you will need a carpenter's square or some other object with a right angle. When you have finished, you will have made a sundial.



SECOND
ACTIVITY
FOR
SKILL A

On a sunny morning, set the sundial in direct sunlight so that the line on the board runs from north to south. You will probably need a compass to accomplish this properly. Every hour, exactly on the hour, locate on the board the shadow of the pencil point. (Use a watch or clock so that the markings are recorded at the exact hours. Make a mark on the board at the exact location of the shadow of the pencil point. Write the hour above the mark. Be careful not to move the board at all.

Leave the board in position. On the next sunny day, you will find that the shadow of the pencil will point to the correct time of day. Leave the board in position for a month or two. (If this is not possible make marks on whatever the board was standing, exactly at the ends of the north-south line on the board. Then, at the end of the month or two, you will be able to replace the board in the original position.)

After a month or two you will see that your sundial is no longer accurate. Why? As the earth circles around the sun, the sun seems to change the path it makes across the sky. (Of course, the sun is not really moving; the earth's motion makes it seem that the sun is moving.) Because of the tilt of the earth, the path of the sun appears to change, as does the accuracy of your sundial since you made the sundial according to "the sun's path" on a particular day. Thus, a sundial is able to give you only an approximate time.



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SCIENCE CURRICULUM FOR GRADE THREE

UNIT III: LATIN AMERICA

SKILL B: Is able to discover that energy stored in still water can be released and used when the water is made to move.

VOCABULARY: stored energy
energy of motion

**FIRST
ACTIVITY
FOR
SKILL B**

Show the class pictures of Niagara Falls. You may ask: ¿Cuántos han tenido la oportunidad de visitar las cataratas? ¿Qué son cataratas? ¿Por qué hay movimiento del agua? Tell the class: En el mundo hay más cataratas. Locate Brazil on the map and continue: Aquí en Brasil se encuentran las cataratas del Iguazu y Paulo Alfonso, consideradas más altas que las del Niagara. Las cataratas son recursos naturales. Encourage the students to suggest ideas. ¿Cómo puede el hombre servirse de estos recursos?

82.3 m

270 ft.



IGUAÇU FALLS, BRAZIL

NIAGARA FALLS, CANADA



49.4 m
162 ft.

SECOND
ACTIVITY
FOR
SKILL B

Place a pan of water on the floor or on a low table where the children can see the water's surface. When the water is completely still, place a boat on it carefully. Through questioning, try to bring out the fact that neither the boat nor the water is moving. Then ask: ¿Cómo podemos hacer que el bote se mueva sin tocarlo y sin soplarlo? Someone is sure to suggest making waves in the water or moving the water in some way.



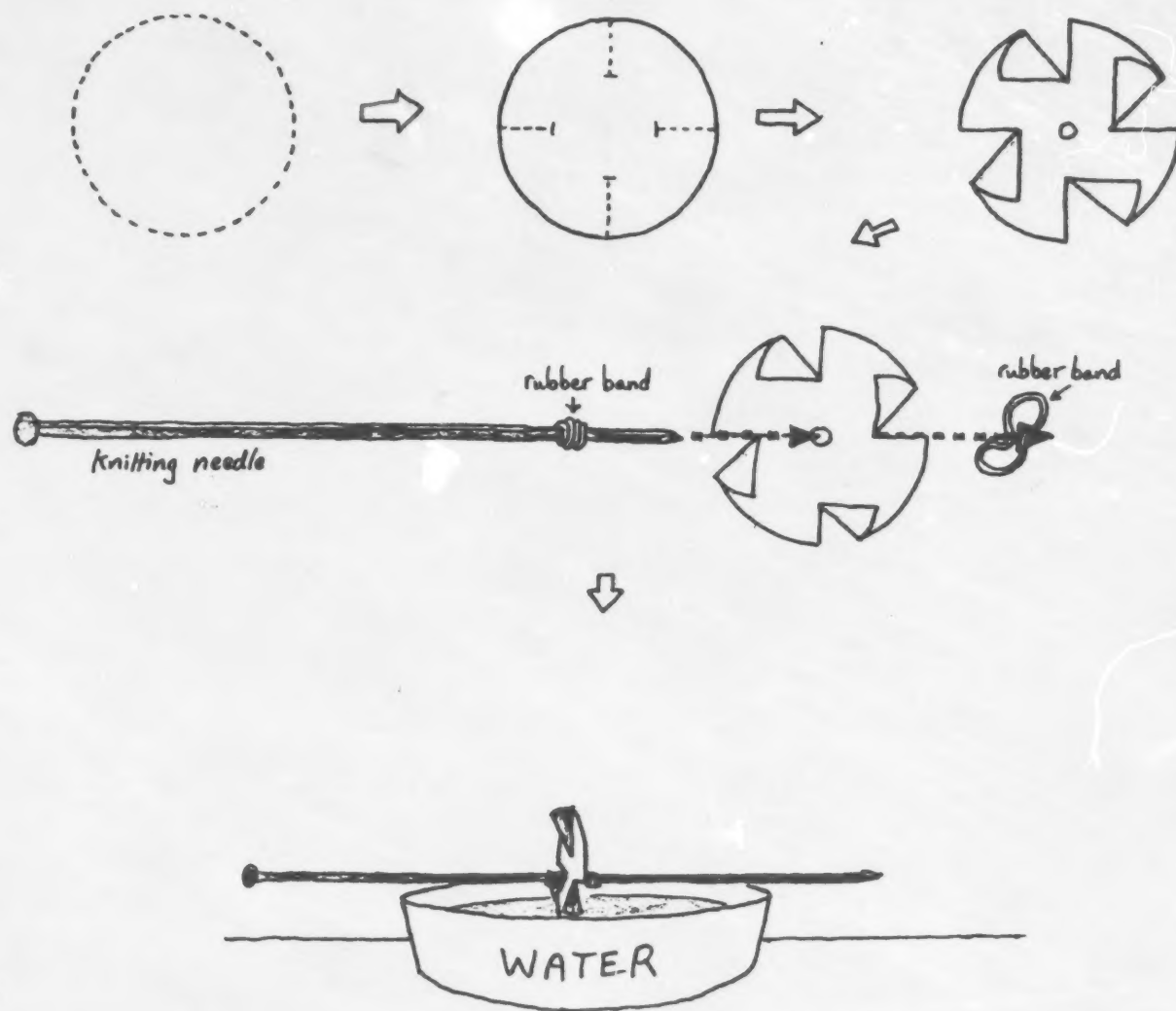
THIRD
ACTIVITY
FOR
SKILL B

To perform the following activity, you will need: a large piece of cardboard, a knitting needle, a large pan of water, and rubber bands. First, cut out a round piece of cardboard from a large milk carton. Then make four cuts and folds. (See picture) Push the knitting needle through the middle of the cardboard. This forms something like a wheel on an axle. Be sure that the cardboard turns freely on the knitting needle.

To prevent the cardboard from sliding off the needle, put rubber bands on the needle on either side of the cardboard. Hold the "wheel" in a large pan filled with water. Ask the class: ¿El agua quieta hace que la rueda se mueva? Remove the wheel from the water. Ask somebody to pour the water over the wheel. Ahora, ¿el agua hace que la rueda se mueva? Usamos la misma agua las dos veces. Pues, ¿qué hace la gran diferencia?

This may also be done as a class activity:

When the wheels are ready, choose individuals to try them out in the pan of still water. Then, help someone to pour the water from the pan slowly over one of the wheels. This part of the investigation will have to be done outdoors, or over a sink or pail. After the investigation, call on volunteers to explain what happened. A few questions to bring out essential points might be presented. For example: ¿Qué sucede cuando la rueda está en agua quieta? ¿en agua en movimiento? ¿De dónde sale la energía para que la rueda se mueva? ¿Puede el agua quieta hacer que algo se mueva? ¿Puede el agua que está cayendo hacer que algo se mueva? ¿Podemos usar la energía del agua en movimiento? ¿Cómo?

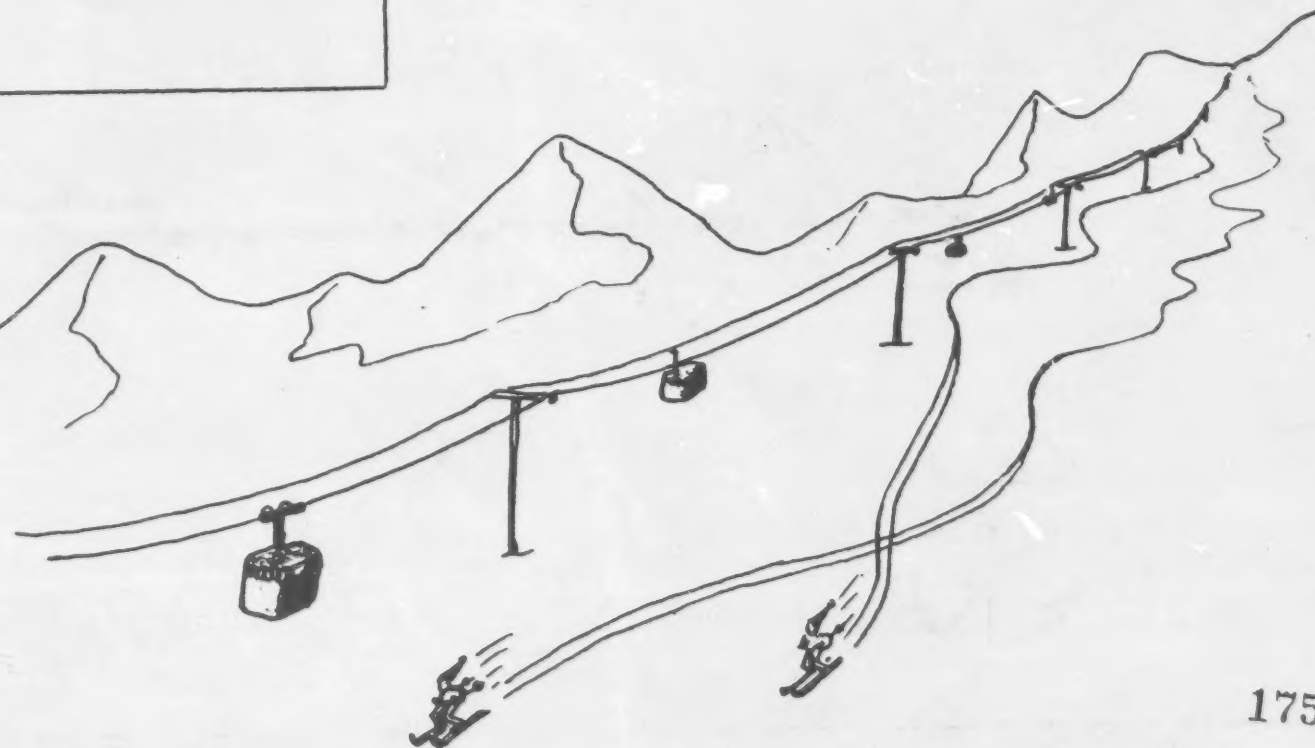


SKILL C: Is aware of the fact that a pulley can change the direction of the force needed to move an object.

VOCABULARY: pulley
wheel
pull

BACKGROUND

Wheels, in the form of pulleys, may be used to change the direction of the motion of an object. Thus, a downward force exerted on the pulley can cause an object to move upwards.



SCIENCE CURRICULUM FOR GRADE THREE

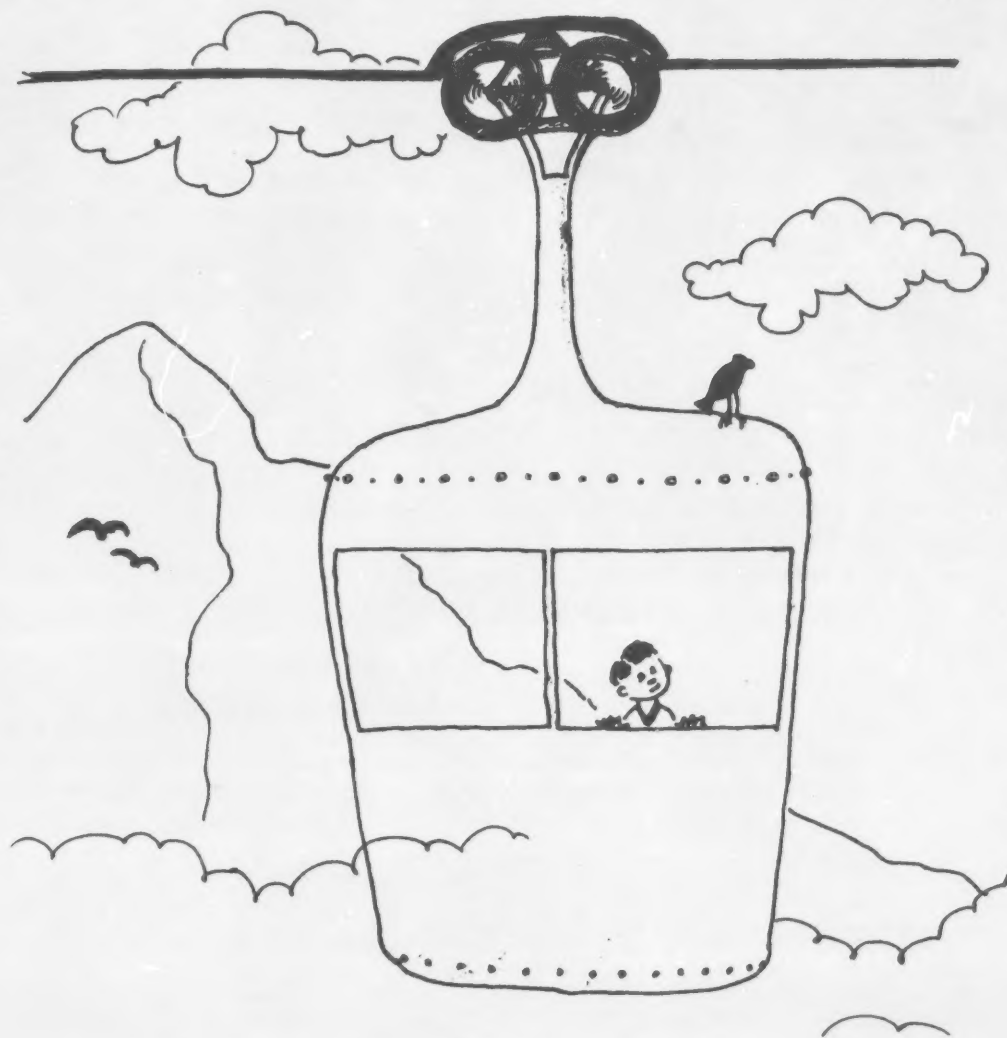
UNIT III: LATIN AMERICA

FIRST
ACTIVITY
FOR
SKILL C

Mention some characteristics of the countries of Latin America. For example, speak of their altitude.

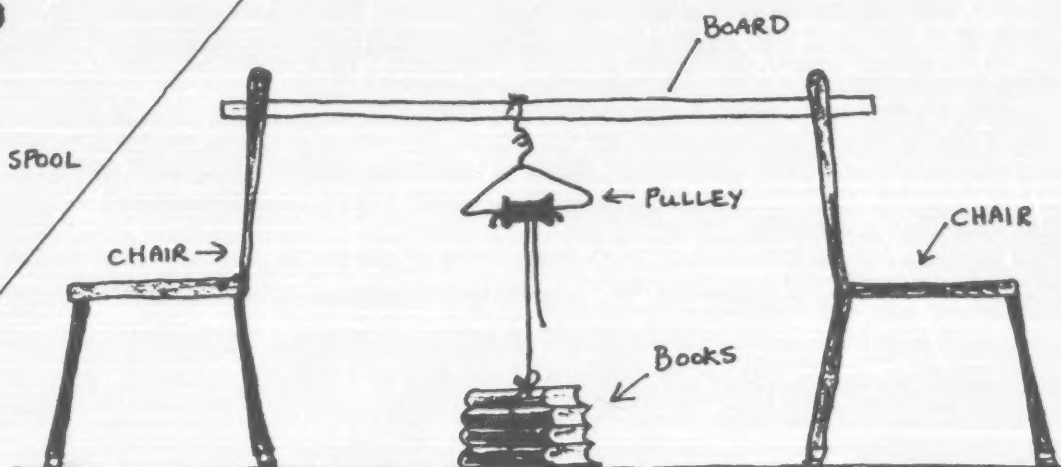
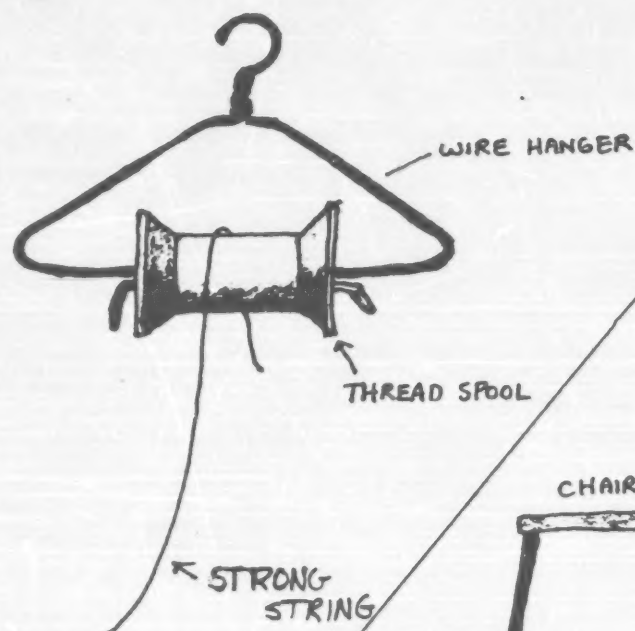
Ask: ¿Piensan ustedes en una manera fácil de llegar hasta las montañas? En Venezuela, por ejemplo, se usa un medio de transportación que se conoce como "cable car." Show pictures or drawings of cablecars so that the students can appreciate the parts of which they are made. List their observations, asking: ¿Cuál es la parte que hace que el carro suba y baje de la montaña? (la polea). Show pictures of pulleys. ¿De qué se compone? ¿Les gustaría averiguar cómo trabaja la polea?

Tell the class that there are cable cars going to the top of the SugarLoaf Mountain in Rio De Janeiro, Brazil, too.



SECOND
ACTIVITY
FOR
SKILL C

It is possible to construct a pulley system by following the diagram below. Ask a student to lift the books to the height of the pulley. Then have him lift the books using the pulley. (He should pull the cord.) Ask him: ¿Qué manera es más difícil? Tell the class about other ways pulleys can be used to make certain jobs easier. (e.g. lifting heavy objects)



HOME MADE PULLEY

SKILL D: Is able to find out which kinds of material conserve the most heat; e.g. cotton, wool, or leather.

VOCABULARY: altitude
insulation
temperature

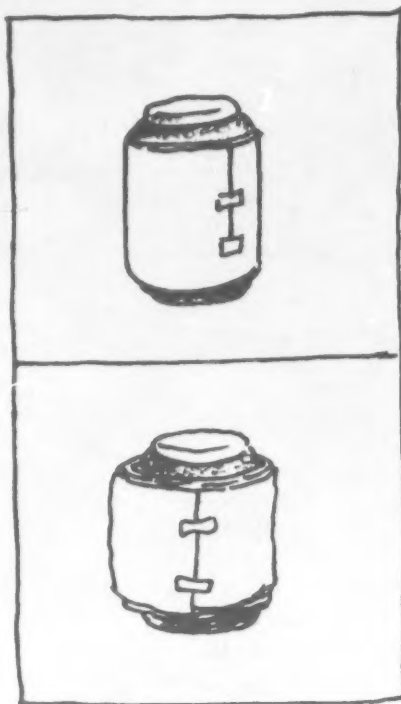
BACKGROUND

Different types of climates exist in Latin America. There are humid regions, deserts, cold and mountainous regions, and tropical forests. As one moves up towards the mountains, the temperature goes down. In the highlands, the climate is temperate in spite of its location in the tropical latitudes. In some parts of the Andes, the temperature drops so much that the inhabitants have to use heavy clothing to protect themselves from the cold. Since the tropical lowlands are unpleasant places in which to live, people prefer to live in the highlands and plateaus.

FIRST
ACTIVITY
FOR
SKILL D

Discuss with the class: Si hace tanto frío en las montañas, ¿qué clase de ropa tiene que usar la gente? ¿Por qué? ¿Qué materiales serían los mejores? ¿Por qué nos conservan caliente la lana y las pieles?

To perform the following experiment, you will need two pieces of light cotton cloth and two jars of the same size. Wrap one jar in one of the pieces of cloth so that it goes around four times and is secure and tight. The other jar should be wrapped a little more loosely. Fill the jars with hot water. Put the lids on tightly and leave them for half an hour. Uncover them. Using a thermometer, find out which jar contains the hotter water. Ask the class: ¿En cuál de los dos frascos había más aire atrapado entre las cuatro vueltas de la tela? El aire no deja pasar el calor fácilmente. ¿Habría aire en las pieles y en la lana que evita la salida del calor? Podemos investigarlo.



SECOND
ACTIVITY
FOR
SKILL D

For this experiment, you will need a little piece of wool and a jar which contains a little water. The wool is made from the hair of a mammal. With a pencil, push the wool to the bottom of the water that is in the jar. Observe the bubbles that come out.

Trapped air helps you to conserve heat. Your body produces heat. You are a mammal and all mammals produce heat. Wool fabrics and furs prevent body heat from escaping easily.





THIRD
ACTIVITY
FOR
SKILL D

In the following experiment, you will be comparing different materials. You will need a little piece of cotton cloth, nylon, acetate and wool. You will need also a jar with some water in it. (You may use the one you used in the previous experiment.) Put the various cloths in the water, one at a time. Ask:

¿De dónde salen más burbujas de aire, de la tela de lana o de la tela de algodón?

¿En cuál hay más aire atrapado? ¿Entiendes ahora por qué la tela de lana y las pieles son más calientes que la tela de algodón?

SKILL E: Is able to understand how cotton thread is made.

VOCABULARY: cotton
thread
cotton fibers

BACKGROUND

In spite of her great industrial development, Brazil continues to be a principally agricultural country. The most important industries such as coffee, soya beans, sugar, cotton, castor oil and menthol, depend on her agriculture. One of the principal industries of Brazil is that of cotton fabrics.

FIRST Show pictures of articles made from cotton. Ask: ¿De dónde sale el material para hacer estos
ACTIVITY artículos? (De una planta llamada algodón) Show illustrations of the cotton plant. Include
FOR the plant in bloom, the plant with the seed pods, the plant with its boles open. Say to the
SKILL E class: Si el algodón está así en la planta, ¿cómo es que llega a convertirse en tela?



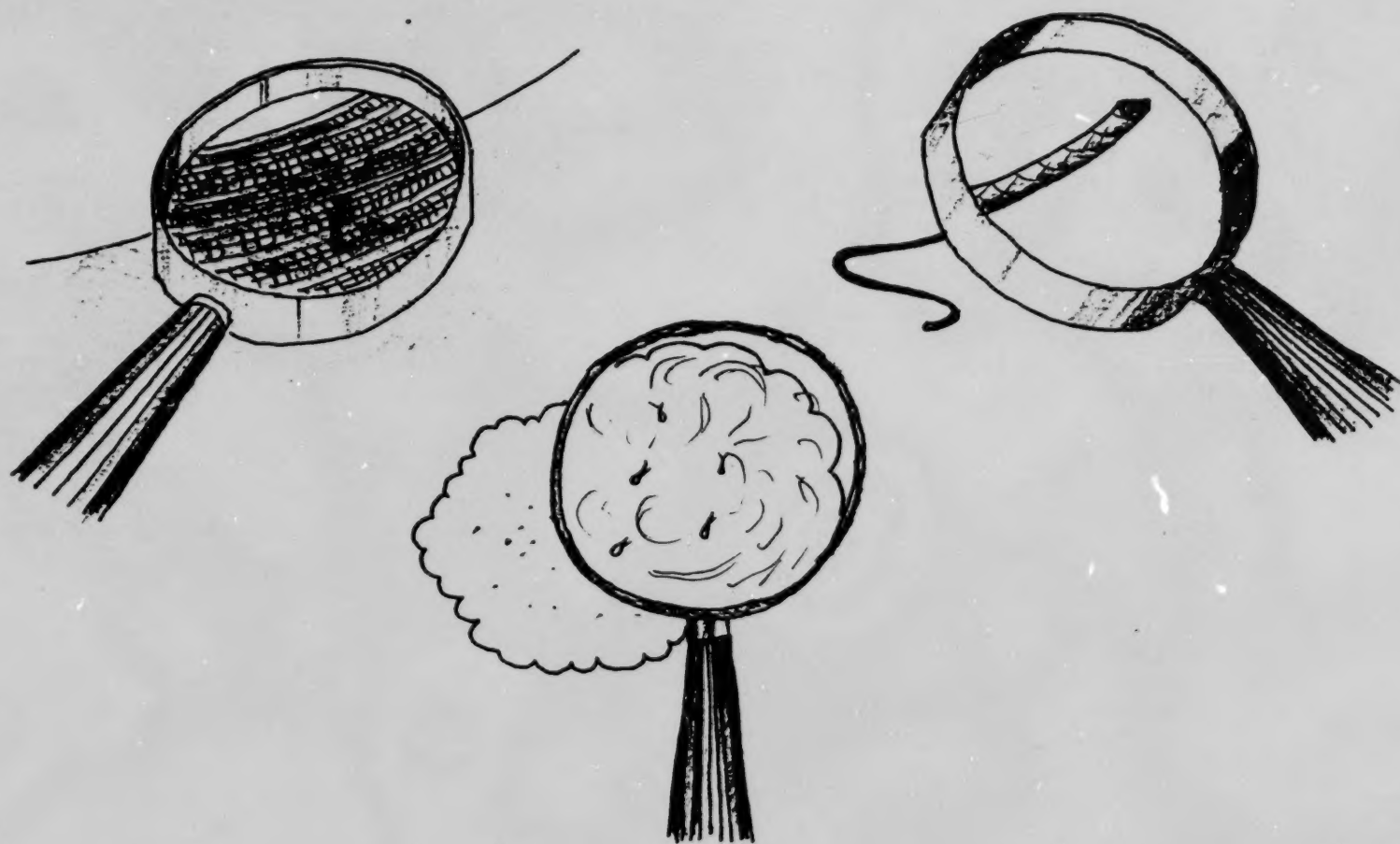
SECOND
ACTIVITY
FOR
SKILL E

All the cotton balls we buy today have been processed so that they contain no seeds. Take a cotton ball and pull on it to get several strands. When the strands cannot be separated further, they are called fibers. Carefully twist together several thin strands until a thread forms. Say:

Si tuvieras suficiente tiempo podrías hacer un hilo fino, largo y fuerte. Piensa cuánto tiempo tardarías en hilar el algodón necesario para hacerte una camisa o un traje.

THIRD
ACTIVITY
FOR
SKILL E

Examine a cotton ball, a cotton thread and a piece of cotton material under a magnifying glass. ¿Qué semejanzas ves? ¿Qué diferencias ves?



SKILL F: Is able to find out the relative hardness of different woods.

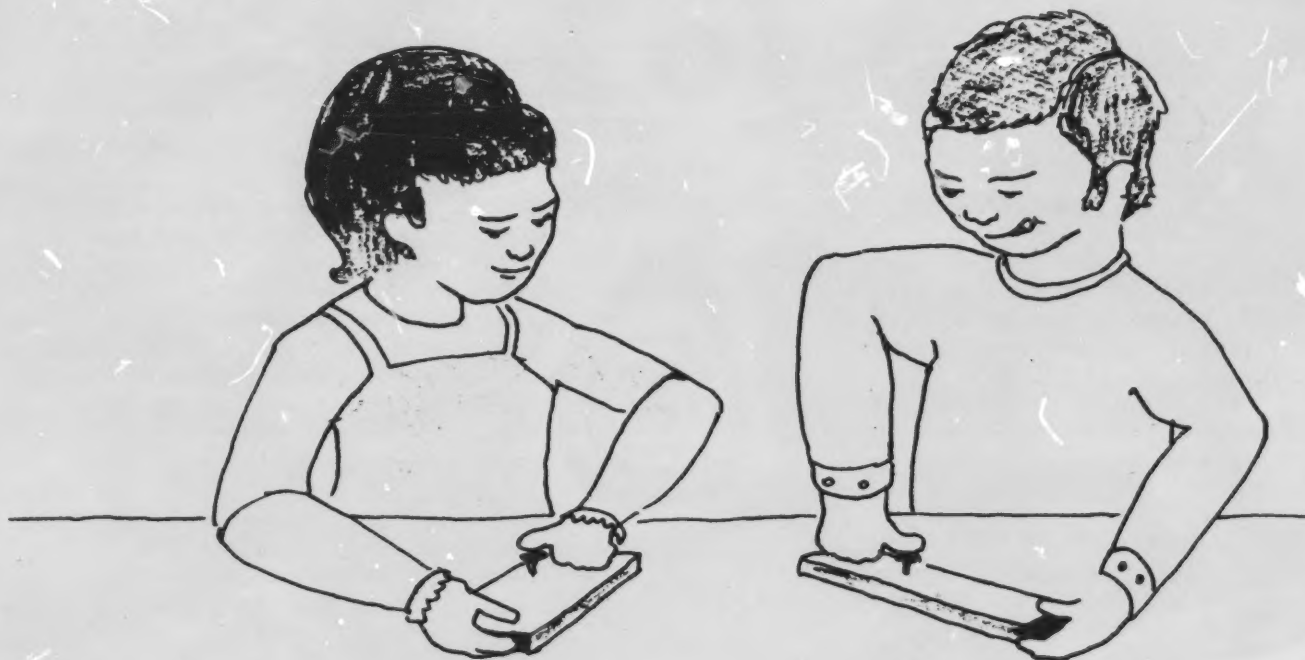
VOCABULARY: hard
hardness
soft
softness

BACKGROUND

Approximately 40% of Latin America, or more than three million square miles of this region is covered with forests. Half of these forests are found in Brazil. In Latin America, different kinds of wood are found. The wood is found so far from the market that cutting and transporting the wood becomes very costly. So, in spite of the fact that Latin America possesses one third of the forests of the world, it supplies only one fifth of the world's wood.

FIRST Say: ¿Crees tú que la madera es útil? ¿Qué cosas tenemos hechas de madera? ¿Es toda la
ACTIVITY madera de la misma clase? Las diferentes clases de árboles nos dan diferentes clases de
FOR madera. Algunas maderas son más duras que otras. ¿Te interesa saber cómo se puede probar
SKILL F la dureza de la madera?

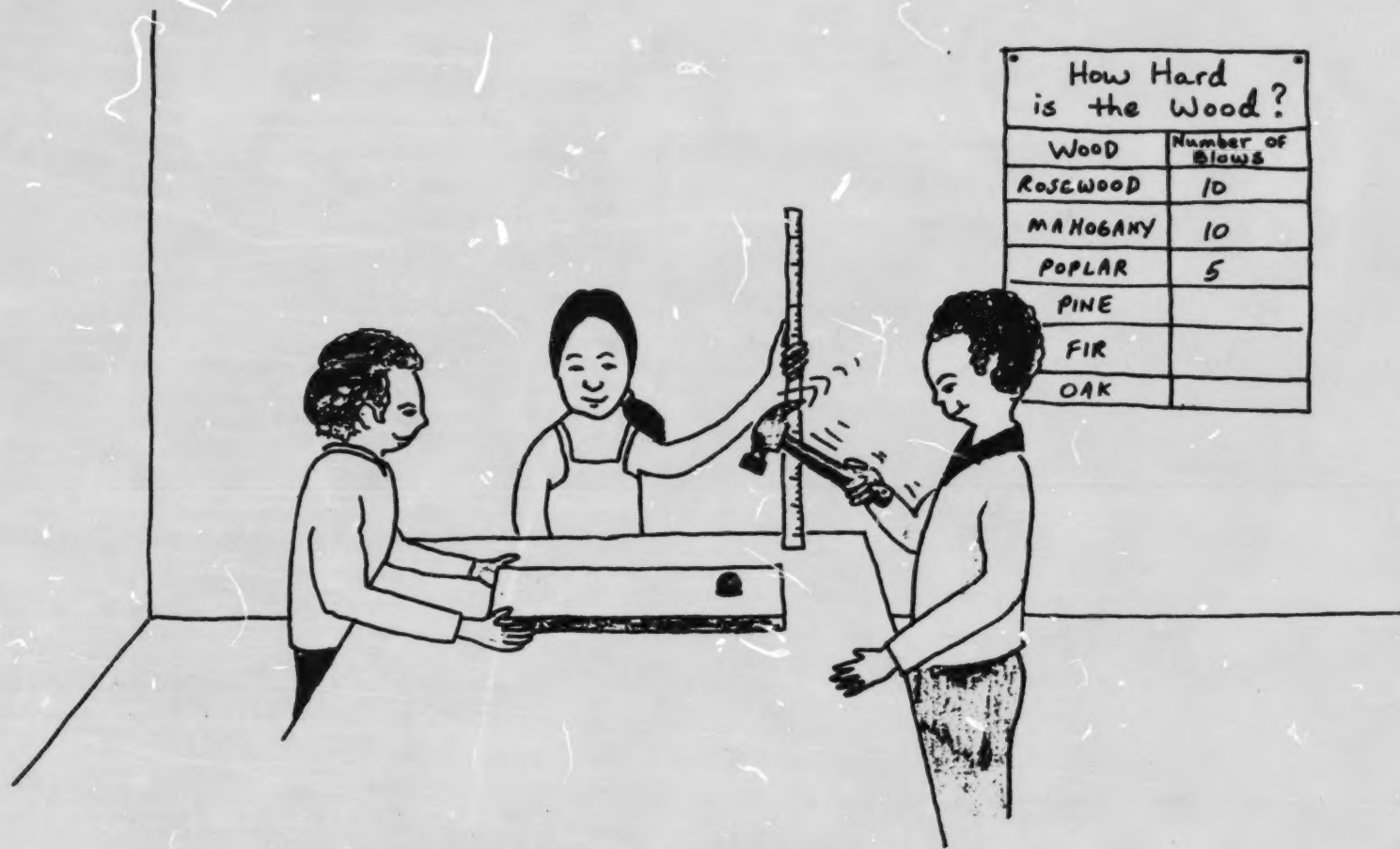
To perform the following experiment, you will need pieces of different kinds of woods and some thumb tacks. Start a thumbtack in each piece of wood and ask the students: ¿Cómo puedes saber de esa forma si unas maderas son más duras que otras?



SECOND
ACTIVITY
FOR
SKILL F

When scientists want to test the hardness of wood, they do not use thumb tacks; they use a special machine. You can make one like it. You need a hammer and a piece of string, and a small steel ball like the ones (ball bearings) found on a roller skate. Have students work in groups of two or three.

Place the little steel ball on a piece of wood. While one student holds the handle of the hammer, another will hold up the hammer head and let it fall. When the hammer head falls on the ball, the ball sinks into the wood a little. Keep dropping the hammer until the little ball sinks completely into the wood. Ask the class: ¿Cuántos golpes fue necesario dar? Now try some other kinds of wood. Note down the number of blows necessary to sink the ball into each piece of wood. Ask the students: ¿En qué clase de madera fue necesario golpear más, en la dura o en la blanda? Make sure that the students realize that the hammer head should always be the same distance from the surface of the wood in order to make a fair comparison. Have another student use a meter stick to measure the distance during the experiment.



THIRD Compare the different kinds
 ACTIVITY of woods found in Puerto
 FOR Rico, Connecticut, and Latin
 SKILL F America. For example:

Rosewood (Jacaranda)-Brazil, hardwood
 Mahogany (Caoba)-Puerto Rico, hardwood
 Poplar (Alamo)-Connecticut, softwood
 Pine (Pino)-Connecticut, softwood
 Fir (Abeto)-Connecticut, softwood
 Oak (Roble)- Connecticut, hardwood

Ask the students to draw bar
 graphs of the results they
 obtained. Ask them to ar-
 range the woods in an order:
 the softest to the hardest,
 the hardest to the softest.

TYPE OF WOOD

NUMBER OF BLOWS

1 2 3 4 5 6 7 8 9 10

ROSEWOOD

MAHOGANY

POPLAR

PINE

FIR

OAK

SCIENCE CURRICULUM FOR GRADE THREE

UNIT III: LATIN AMERICA

FOURTH
ACTIVITY
FOR
SKILL F

Have the children vary the distance between the hammer and the surface of the woods for each set of experiments (See illustration below).

Distance of Hammer Head to Wood Surface (centimeters)	NUMBER OF BLOWS					
	ROSEWOOD	MAHOGANY	POPLAR	PINE	FIR	OAK
3 cm.						
6 cm.						
9 cm.						
12 cm.						
15 cm.						
18 cm.						

UNIT IV: EUROPE

- SKILL A: Is able to infer the Europeans' way of life after becoming familiar with the average temperatures of a winter month (January) and a summer month (July) in certain European cities.
- SKILL B: Is able to construct bar graphs from given data using ordered pairs.
- SKILL C: Is able to identify the reasons that Norway is known as "the land of the midnight sun".
- SKILL D: To become aware of a great variety of land animals, each kind adapted to its own environment.
- SKILL E: Is able to make an operational definition of molecules.

SCIENCE CURRICULUM FOR GRADE THREE

UNIT IV: EUROPE

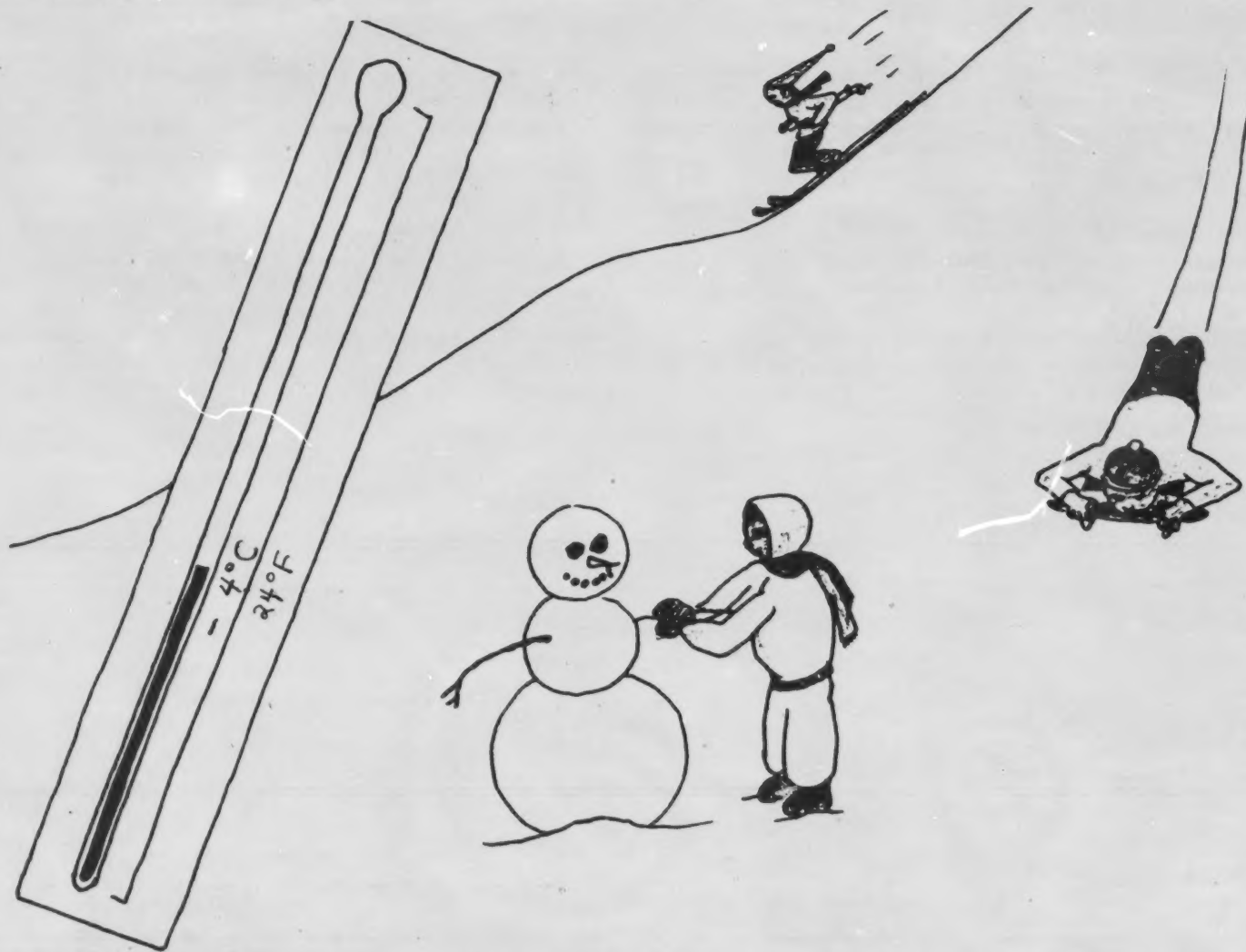
SKILL A: Is able to infer the Europeans' way of life after becoming familiar with the average temperatures of a winter month (January) and a summer month (July) in certain European cities.

VOCABULARY: climate
temperature
thermometer
average temperature
table

BACKGROUND

Temperature is how hot or cold a certain place is at a specific time. Climate is a description of a place's weather (temperature and rainfall) over a period of time. In this skill we will be dealing with two temperatures. They are the average temperatures for a winter month (January) and a summer month (July). If the students have not yet studied averages, it is sufficient to say that the average temperature of that month is the usual temperature for that month. (Technically speaking, the average temperature is the numerical result obtained by dividing the sum of all the temperatures in that month by the number of days in that month.)

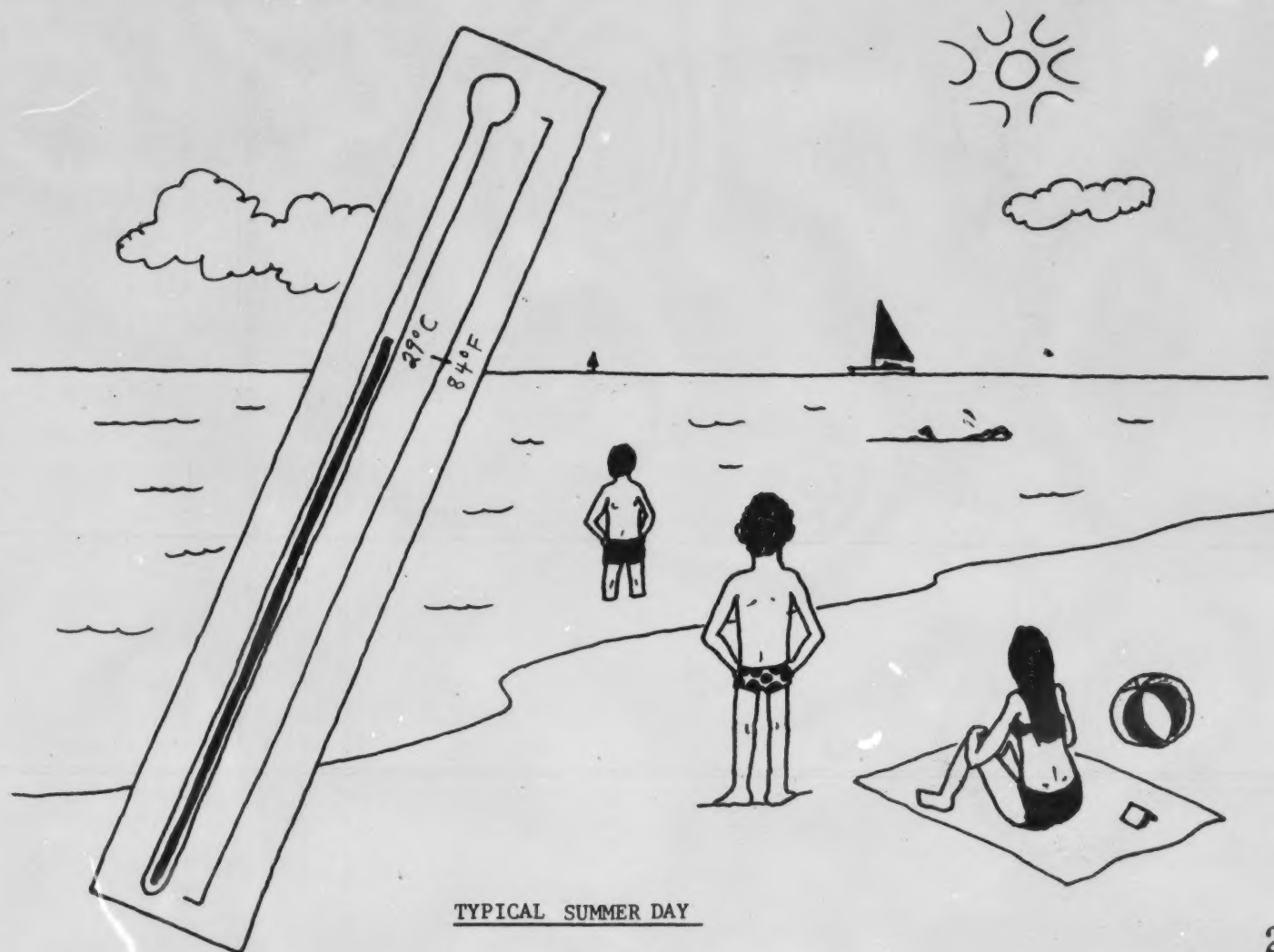
FIRST ACTIVITY FOR SKILL A Part I: Have the students read about the climate in Connecticut. Prepare one drawing of a thermometer indicating the temperature of Connecticut on a typical winter day and another indicating the temperature on a typical summer day. Have the students make observations about how they dress in winter and in summer and have them relate these observations to the respective temperatures of that season.

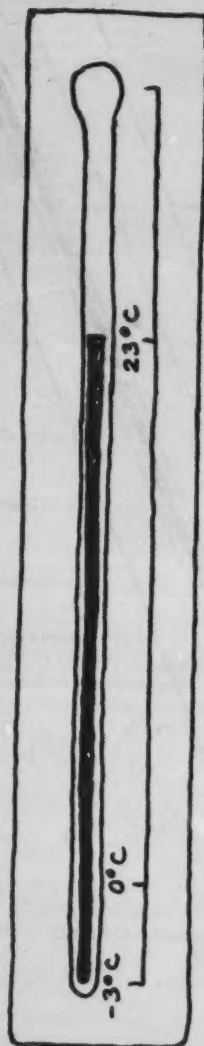


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TYPICAL WINTER DAY

TYPICAL SUMMER DAY



la más alta ⇒ EL VERANO ⇒



la más baja ⇒ EL INVIERNO ⇒



SCIENCE CURRICULUM FOR GRADE THREE

UNIT IV: EUROPE

Part II: Have the students investigate the climate of certain European cities. Have them read from the TABLE OF AVERAGE TEMPERATURES FOR JANUARY AND JULY IN CERTAIN EUROPEAN CITIES.

*TABLE OF AVERAGE TEMPERATURES FOR JANUARY AND JULY IN
CERTAIN EUROPEAN CITIES

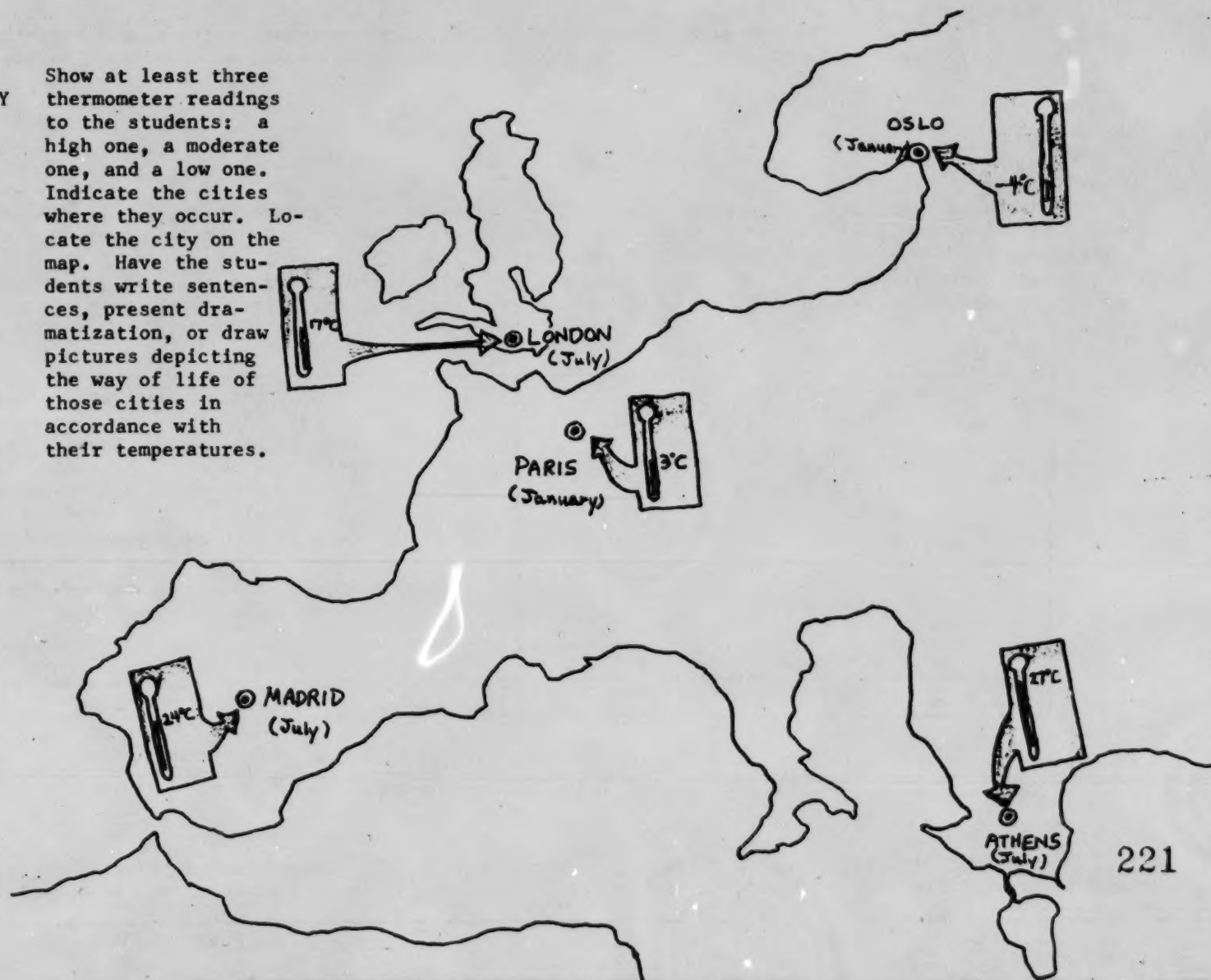
JANUARY			JULY		
AVERAGE TEMPERATURE			AVERAGE TEMPERATURE		
	C°	(F°)		C°	(F°)
Athens, Greece	8.8	(48.0)		27.2	(81.0)
Berlin, Germany	-1.0	(30.2)		18.0	(64.4)
Frankfurt, Germany	0.6	(33.0)		18.6	(65.5)
London, Great Britain	3.6	(38.5)		17.5	(63.5)
Madrid, Spain	4.4	(40.0)		23.6	(74.5)
Marseilles, France	6.8	(44.2)		22.2	(72.0)
Oslo, Norway	-4.4	(24.1)		17.0	(62.6)
Paris, France	3.2	(37.8)		18.7	(65.6)
Rome, Italy	7.2	(45.0)		24.4	(76.0)
Zurich, Switzerland	1.1	(34.0)		19.7	(67.5)

Divide the class into small groups and have them prepare drawings of thermometers indicating the average temperatures for those European cities. (This may also be done as an individual activity.) Ask questions such as the following: ¿Dónde se registra la temperatura más alta? ¿y la más baja? ¿En que estación crees tú que ocurren estas temperaturas? ¿Qué tipo de ropa crees tú que se ponen los europeos? ¿Cómo le afecta la temperatura? ¿Por qué? ¿Cuándo ocurren esas temperaturas?

* A table, here, means a compact arrangement of related facts, figures, values, etc. in orderly sequence, and usually in rows and columns, for convenience of reference.

**SECOND
ACTIVITY
FOR
SKILL A**

Show at least three thermometer readings to the students: a high one, a moderate one, and a low one. Indicate the cities where they occur. Locate the city on the map. Have the students write sentences, present dramatization, or draw pictures depicting the way of life of those cities in accordance with their temperatures.



SCIENCE CURRICULUM FOR GRADE THREE

UNIT IV: EUROPE

SKILL B: Is able to construct bar graphs from given data using ordered pairs.

VOCABULARY: horizontal axis
vertical axis
bar graph
variable
dependent variable
independent variable

NOTE TO TEACHER: All the activities in Skill B must be done in sequence. If necessary, refer to Unit I, Skill B for review of horizontal axis and vertical axis.

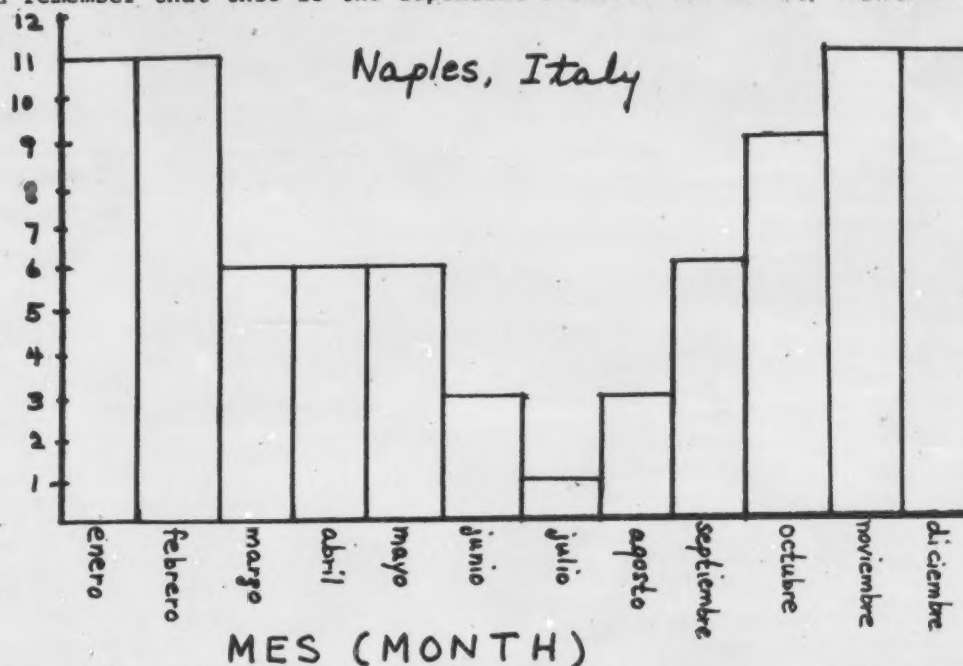
FIRST ACTIVITY FOR SKILL B Use the table for The NUMBER OF DAYS OF RAIN PER MONTH IN NAPLES, ITALY. Present the table to the students for them to read the number of days of rain in each month. Ask one student to choose a month and have another student give the number of days of rain for that month. Ask in the class ¿En qué mes llueve mas? ¿En qué mes llueve menos?

TABLE FOR THE NUMBER OF DAYS OF RAIN PER MONTH IN NAPLES, ITALY

MONTH	NUMBER OF DAYS OF RAIN
enero	11
febrero	11
marzo	6
abril	6
mayo	6
junio	3
julio	1
agosto	3
septiembre	6
octubre	9
noviembre	11
diciembre	11

SECOND
ACTIVITY
FOR
SKILL B

Have the students prepare a bar graph utilizing the table given for Naples, Italy. Get them to recall what they prepared in the first unit. Ask, for example: ¿Qué necesitamos para preparar la gráfica? (dos puntos de referencia) ¿Cuáles son esas referencias? (el número de días en que cae lluvia y los meses en que ocurren) ¿Dónde colocamos los meses? (en el eje horizontal) - The teacher should remember that this is the independent variable - ¿Dónde colocamos los días? (en el eje vertical) - The teacher should remember that this is the dependent variable for it depends on the month.

NÚMERO DE
DÍAS DE LLUVIA(NUMBER
OF
RAIN DAYS)NOTE:

A variable is a factor which changes and has no fixed value. An independent variable changes without being affected by outside influences while a dependent variable changes depending upon outside influences. In this case, the month (on the horizontal axis) is the independent variable, while the number of days of rain (on the vertical axis) is the dependent variable. The number of rain days is dependent upon the month. By convention, the independent variable is usually graphed along the horizontal axis (sometimes referred to as the x-axis), while the dependent variable is graphed along the vertical axis (sometimes referred to as the y-axis).

THIRD
ACTIVITY
FOR
SKILL B

When each student has finished his graph, discussion should proceed. Guide the class with questions such as the following: ¿Qué representa la barra más alta? ¿En qué mes está? ¿Qué representa la barra más baja? ¿En qué mes está?

Discuss with the students the advantages of presenting information in this way. One advantage is that you can get a quick comparison of the rainfall in each month.

SKILL C: Is able to identify the reasons that Norway is known as "the land of the midnight sun".

VOCABULARY: rotation
midnight sun

BACKGROUND

Norway belongs to the group of Scandinavian countries along with Sweden, Denmark and Finland. Norway is sometimes referred to as the land of the "midnight sun". Norway means "road towards the north". In Norway, there is a region during the summer where the sun shines at all hours of the day and night.

FIRST
ACTIVITY
FOR
SKILL C

Recall the experiment which was done in Unit I, Skill D, Activity 3. This experiment dealt with the rotation of the earth. Ask, for example: ¿Qué sucede mientras, en los Estados Unidos, es de día? ¿Es de día en todos los países del mundo? ¿A qué se debe que haya día y noche?

SCIENCE CURRICULUM FOR GRADE THREE

UNIT IV: EUROPE

SECOND
ACTIVITY
FOR
SKILL C

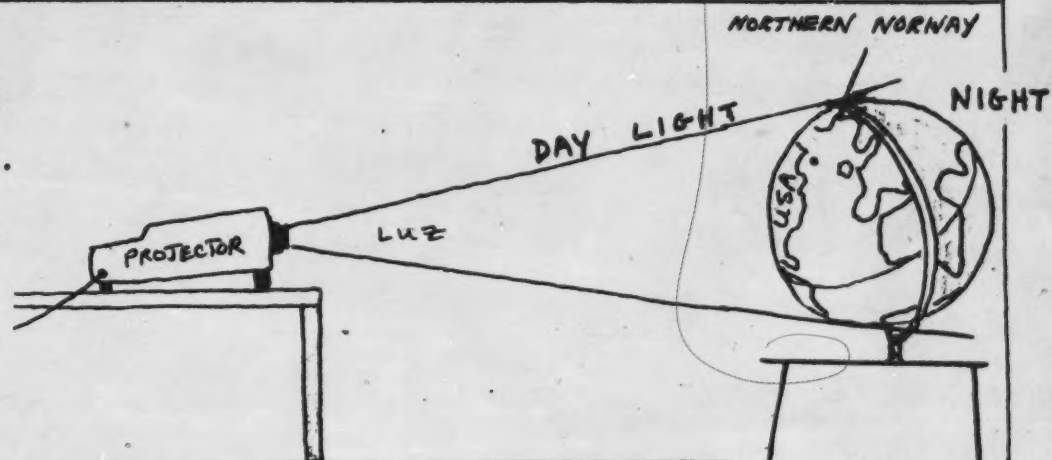
Locate Norway on the map. Do an experiment which demonstrates why there is sunlight in a certain part of Norway all the time. You need a globe and a strong light. An electric lantern will serve, but a slide projector would be even better.

a) Hold the globe, tipping it a little to one side. The North Pole is inclined toward the sun and the South Pole is inclined away from the sun. The globe should be inclined in this way because during the summer the earth is tipped that way in relation to the sun.

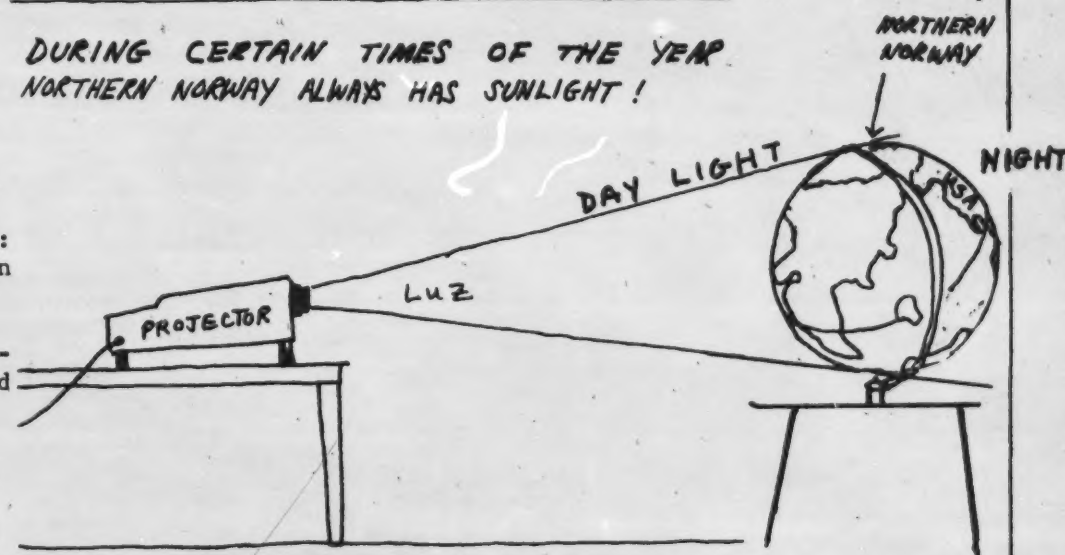
b) Project the light on the globe. Make it rotate so that the United States is under the light. Observe that it is now night in the United States. Ask: ¿Brilla el sol ahora en la región norte de Noruega?

c) Continue making the globe rotate slowly. The children should observe how night and day come to the United States and to other parts of the world. Then, you may ask: ¿Puedes explicar ahora por qué no sale ni se pone el sol sobre la región norte de Noruega en esta época del año?

Have the students answer the following question: ¿Por qué no hay luz solar en el invierno del norte de Noruega? ¿Por qué no sale y se pone el sol diariamente, como en otras partes de la tierra.

THIRD
ACTIVITY
FOR
SKILL C

*DURING CERTAIN TIMES OF THE YEAR
NORTHERN NORWAY ALWAYS HAS SUNLIGHT!*



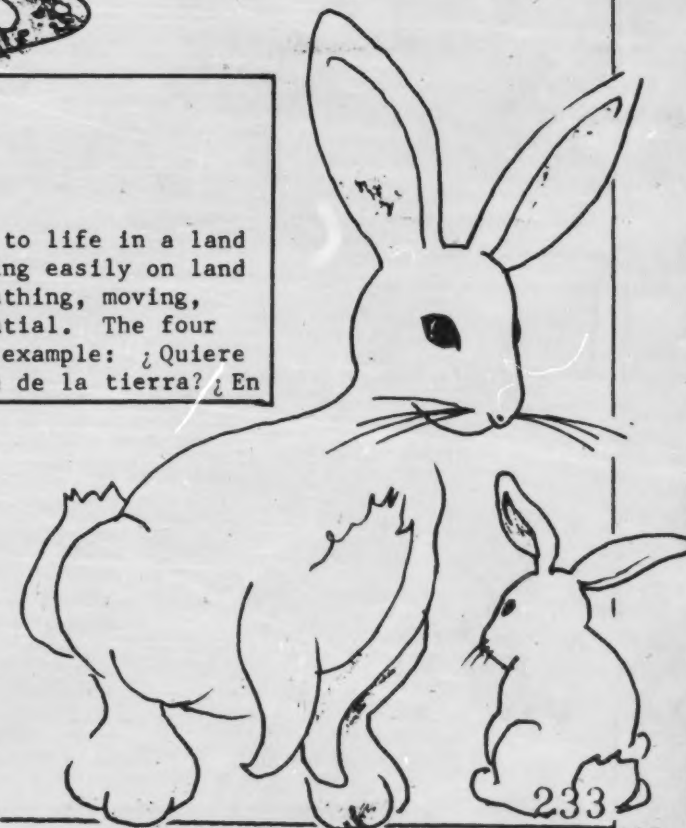
SKILL D: To become aware of a great variety of land animals, each kind adapted to its own environment.

VOCABULARY:

forest
jungle
adapted
environment
food chain

FIRST Children might be called upon to give
ACTIVITY reasons why each of the following an-
FOR imals could not live in the sea:
SKILL D butterfly, rabbit, sparrow and ant.

Through discussion, the fact will be brought out that each is adapted to life in a land environment. Each breathes air from the atmosphere, has a way of moving easily on land or in the air, and is dependent on foods that are found on land. Breathing, moving, and feeding are essential life activities. Having young is also essential. The four species mentioned above can reproduce only on land. You may ask, for example: ¿Quiere decir esto que los animales terrestres pueden vivir en cualquier parte de la tierra? ¿En los bosques? ¿En las selvas tropicales? ¿En las montañas? ¿Qué distintos ambientes terrestres contienen distintas clases de animales?



SECOND
ACTIVITY
FOR
SKILL D

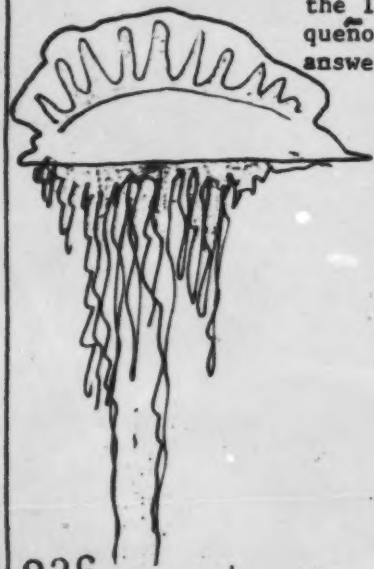
On the map of Europe
locate mountains,
oceans, and seas.
Elicit discussion
with questions such
as: ¿Cómo son las
montañas? ¿Por
qué nos son impor-
tantes las mon-
tañas hoy día?
¿Cómo son los mares?





THIRD
ACTIVITY
FOR
SKILL D

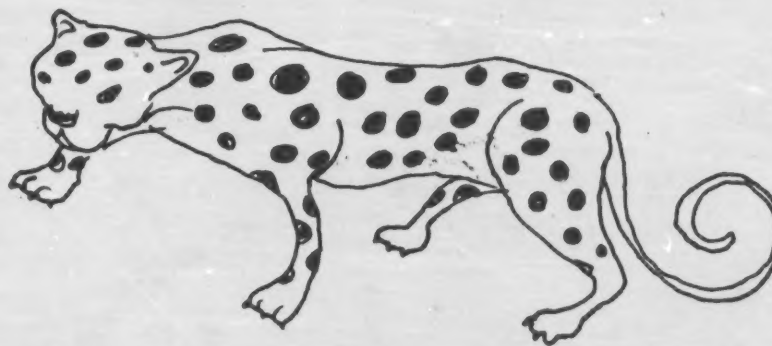
Show pictures to the class of animals from both land and water. Identify these animals, and ask the class: ¿Dónde viven estos animales: en la tierra o en el agua? Then, for the land animals, ask: ¿Cuáles animales viven en las montañas? ¿En los bosques? ¿Cuáles podrían vivir en una finca? When the discussion about the land animals is over, ask: ¿Dónde viven estos animales: en un estanque pequeño o en un oceano grande? Ask the students to support with reasons all of their answers.



FOURTH
ACTIVITY
FOR
SKILL D

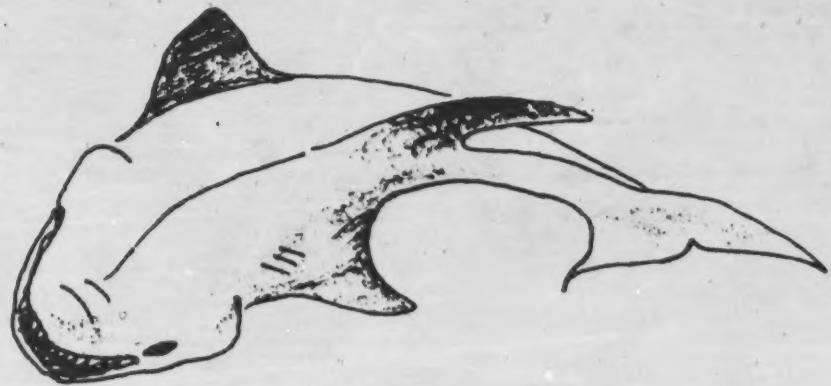
Initiate a conversation about what it is like in a forest or woods. Children who have camped or picnicked out in the woods will be eager to describe a woodland environment.

Present pictures of animals of different lands. Ask questions to help pupils to discover ways in which the animals pictured are related to their environment. Ask, for example: ¿Cuáles de estos animales parecen buscar alimento? ¿Qué comen y cómo consiguen el alimento que necesitan? ¿Se conservarían estos animales en un zoológico, en un circo, o en un clima frío? You may go on to explain that modern zoos attempt to recreate as much of a jungle environment as possible. Foods similar to the foods consumed by the animals in their natural state are provided, and the animals are kept in moist, heated quarters during the cold months.

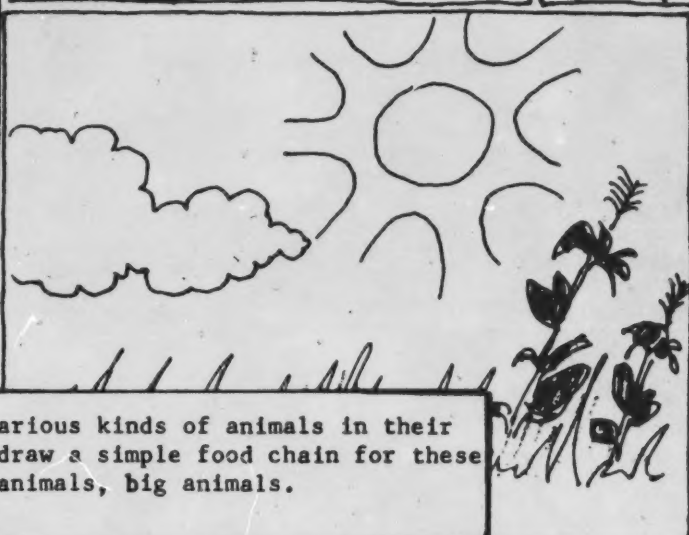
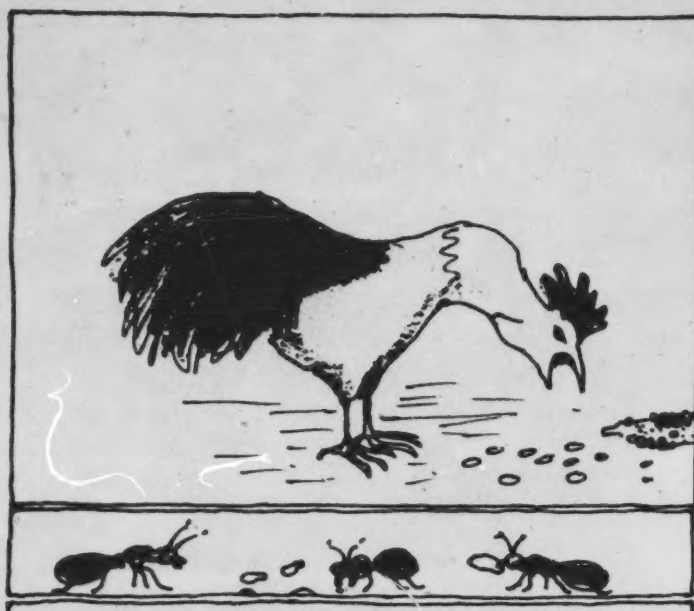




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FIFTH The teacher will present pictures of various kinds of animals in their
ACTIVITY own environment. Ask the students to draw a simple food chain for these
FOR animals. For example: plants, small animals, big animals.
SKILL D



SKILL E: Is able to make an operational definition of molecules.

VOCABULARY: molecules
evaporation
smell
tiniest parts
characteristics
substance
gas

BACKGROUND

One of the most famous products made in France is perfume. The French perfume is exported to all different parts of the world. Millions of dollars have been spent by perfume makers to find new and appealing smells. Perfumes have the characteristic of smelling good. Molecules are the tiniest parts of a substance which still maintain the characteristics of that substance. Substances are things like water, air, perfume, candy, ginger ale, and all other materials you can name.

FOR TEACHERS ONLY:

Molecules are made up of definite proportions of atoms. An atom is the smallest unit of an element to retain its individuality. For example, a carbon atom is still carbon, but, if the atom is

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further broken up, the resulting parts do not have the chemical properties of carbon.

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SCIENCE CURRICULUM FOR GRADE THREE

UNIT IV: EUROPE

FIRST
ACTIVITY
FOR
SKILL EMolecules of Perfume

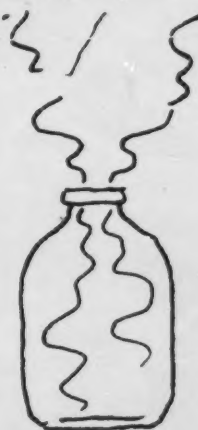
MATERIALS NEEDED: large empty bottle,
colored perfume

Ask the children to smell the bottle of perfume. They should realize that perfume is a colored liquid and can be poured. As a liquid, the perfume also takes the shape of its container. Ask the children to smell the large bottle.

¿Está llena de aire o está vacía? ¿Tiene olor el aire? ¿Puedes oler lo que hay en la botella? Put one drop of perfume into the large bottle and pass the bottle around the class. Ask each student to hold the bottle under his/her nose. ¿Puedes oler el perfume? The drop of perfume fell to the bottom of the bottle. ¿Puedes olerlo? ¿Puedes verlo? ¿Cómo puede llegar el perfume a tu nariz?

Ask the children to continue looking at the bottle. ¿Está la gota de perfume todavía en el sitio? ¿A dónde desapareció? Explain that the perfume has evaporated. This means that it has changed from a liquid to a gas. The perfume gas has mixed with air in the bottle. As the very tiny parts of the perfume gas spread out, some of them reached your nose. That is why you can smell the perfume. You smell things when some of their tiny, tiny parts reach out. These tiny parts are molecules of perfume mixed with molecules of air.





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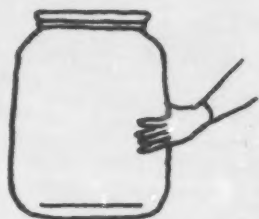
SECOND
ACTIVITY
FOR
SKILL E

Molecules of Mothballs

MATERIALS NEEDED: small pieces of a mothball and a jar.

Ask the children to smell the mothball and smell the jar.
¿Qué hueles? Put the pieces of mothballs into the jar and ask them to smell the air at the opening of the jar.
¿Puedes ver la bolitas de neftalina en el fondo del jarro? ¿Puedes oler la bolita de neftalina al tope? ¿Qué está pasando? ¿Las bolitas se pone más grandes o más pequeñas? ¿Desaparecen como el perfume? Explain that mothball pieces are solids. They evaporate directly into a gas without going through the liquid stage. The mothball gas spreads out and mixes with the gas in the air. Some of the tiniest parts of the mothball are called molecules. One drop of perfume and one tiny piece of mothball contain millions of molecules.





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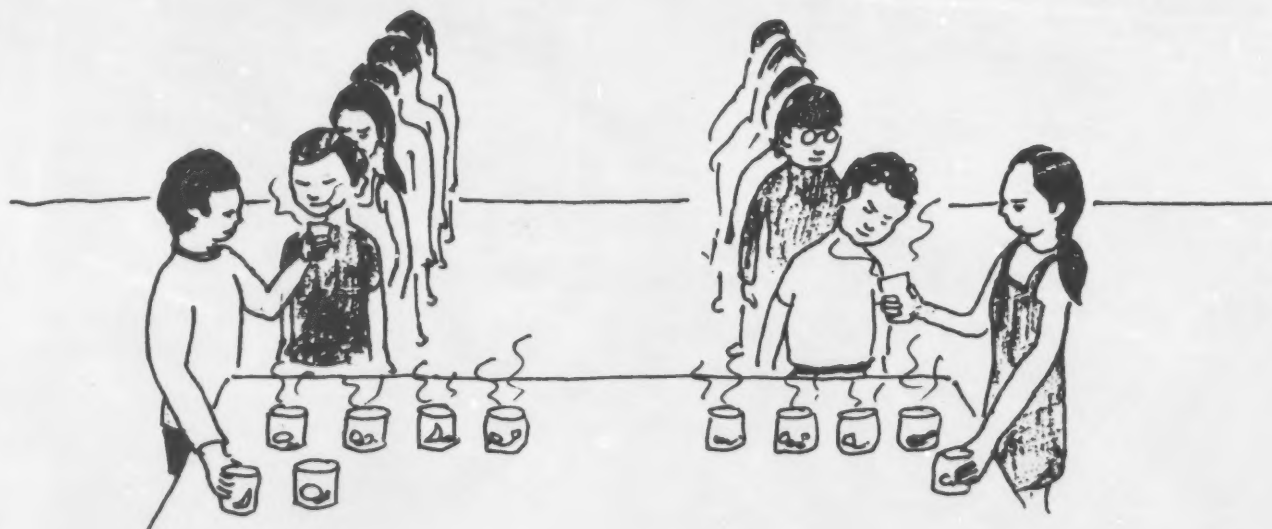
THIRD
ACTIVITY
FOR
SKILL E

Molecules of Food

MATERIALS NEEDED: several baby food jars and different types of foods, flowers, etc. (onions, oranges, bananas, hot chocolate, etc.)

Place small pieces of foods into different jars. Divide the class into two teams and choose two students to be testers. Each team lines up facing the tester. Each test has about four or five jars with different foods in it. The student who is "up" must close his/her eyes while the tester opens one jar. The student should smell the jar and decide what food he/she smells. The student should go to the end of the line if he/she gives the correct answers but go to help the tester if he/she gives the wrong answer.

After everyone has had at least one turn at guessing, the tester may make the game more difficult by putting two, three or four, different kinds of food in the jar. Once again the teacher should stress the fact that the smells come from evaporation of the liquid molecules in the foods. These very tiny gas parts which mixed with air are called molecules.



FOURTH
ACTIVITY
FOR
SKILL E

What Did I Have For Dinner?

MATERIALS NEEDED: Plastic bags with twisters

The teacher should give out gallon size plastic bags to two students a day. Ask them to take these bags home with them and while their mothers are making supper to use the plastic bag to capture the cooking smells and then quickly securing the smells with twisters. Next day these students could release these smells one at a time into the classroom and let the other children guess what they had for supper. ¿Qué comí ayer?

It is important to stress that the smells are in fact very tiny gaseous molecules of last night's dinner mixed with air molecules.



UNIT V: ASIA

- SKILL A: Is able to understand the concept of density with respect to area.
- SKILL B: Is able to know that air holds moisture: hot air holds more moisture than cold air.
- SKILL C: Is able to know that the weather is dependent upon air, water, wind, and sun.
- SKILL D: Is able to know that dark-colored objects hold on to heat from the rays of the sun better than light colored objects.
- SKILL E: Is able to describe the characteristics of some organisms of the desert.
- SKILL F: Is able to identify the ways organisms adapt to the desert environment.
- SKILL G: Is able to know that objects heavier than water will sink and objects lighter than water will float.

SKILL A: Is able to understand the concept of density with respect to area.

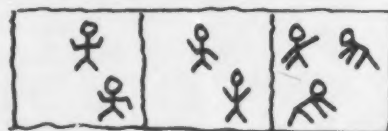
VOCABULARY: area
population
density
dense
denser
less dense

BACKGROUND

Density deals with how crowded something is. It is the ratio of the mass of an object to its volume or the number of something per unit area. The teacher could discuss the population densities in various Asian countries and compare them with Puerto Rico, South American and European countries.

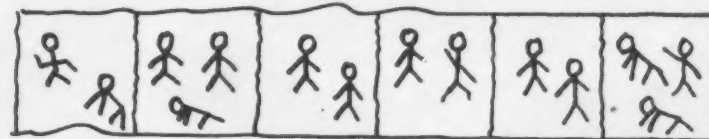
FIRST
ACTIVITY
FOR
SKILL A

Using paper dolls and paper, ask the students to place the dolls on the paper. By varying the number of dolls and the size of the paper the children should be able to tell which area is more dense.

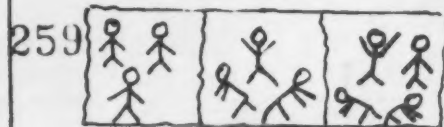


AREA: 3 boxes/POPULATION: 7 people

SAME
DENSITY

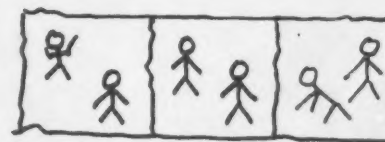


AREA: 6 boxes/POPULATION: 14 people



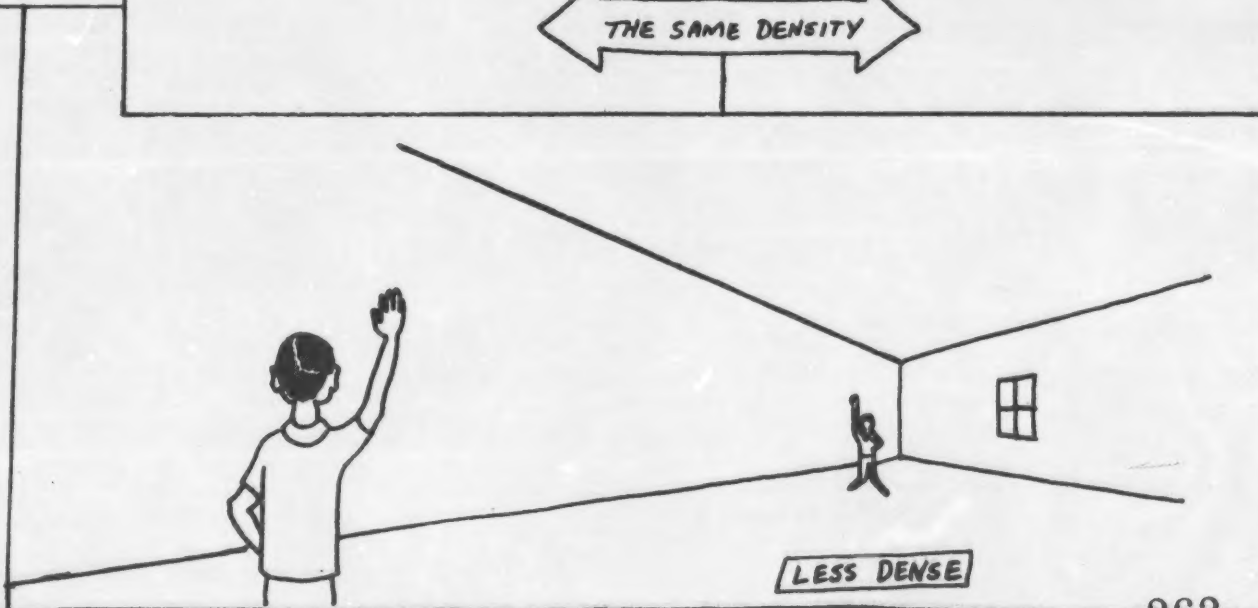
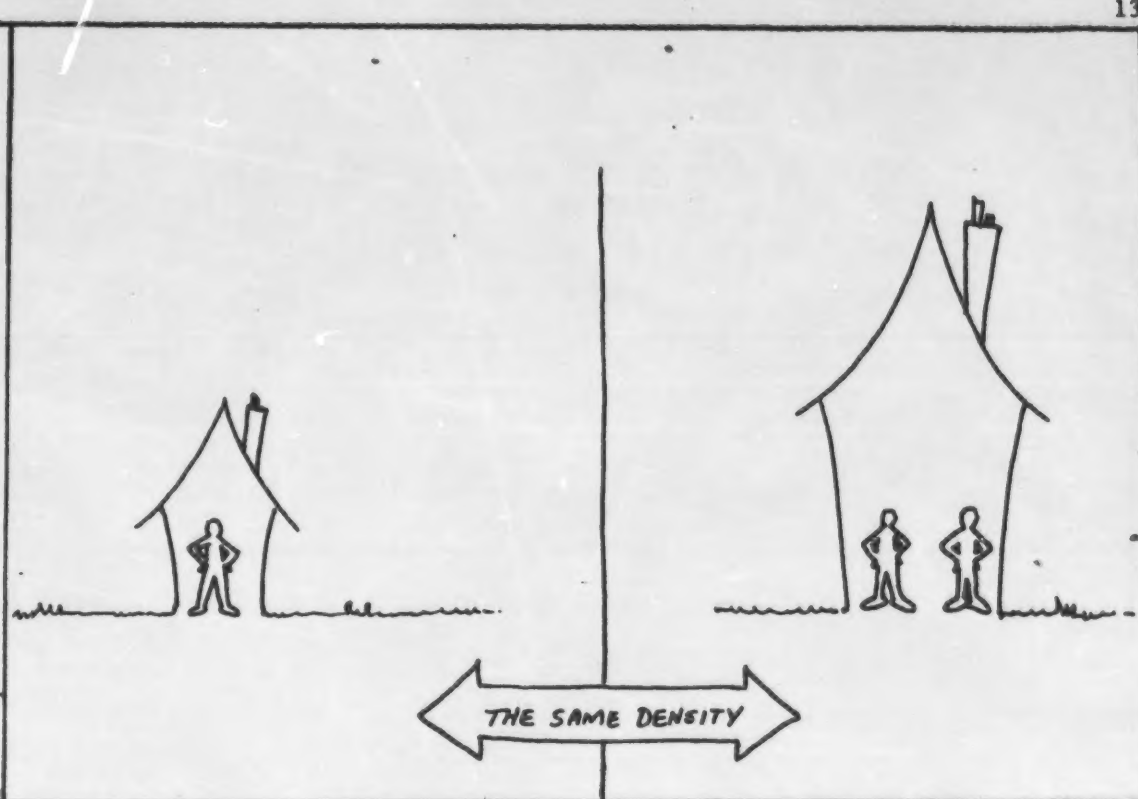
AREA: 3 boxes/POPULATION: 10 people

MORE
DENSE



AREA: 3 boxes/POPULATION: 6 people

LESS
DENSE



SECOND
ACTIVITY
FOR
SKILL A

Ask each student in the class to tell how many people live in his/her home. For example:

Tony: 5 people/household (5 people per household)

Carmen: 6 people/household (6 people per household)

Rosa: 4 people/household (4 people per household)

Put the data on the blackboard. Ask the students to list households from most dense to least dense per household. Remember that the unit "area" here is household.

THIRD
ACTIVITY
FOR
SKILL A

Ask each student in the class to tell how many people live in his/her home and how many rooms there are in his home. For example:

Tony: 5 people/5 rooms (5 people per 5 rooms)

Carmen: 6 people/5 rooms (6 people per 5 rooms)

Rosa: 4 people/2 rooms (4 people per 2 rooms)

Ask the students to list the data from least dense to most dense. The unit "area" here is room. ¿Cuántas personas para cada habitación?

FOURTH
ACTIVITY
FOR
SKILL A

Look at the data in the Second Activity and the Third Activity. Es el orden el mismo en cada tabla? Ask the students to suggest reasons why the orders are not the same. It is important to stress that density is "crowdedness" per unit area. The unit "area" in the Second Activity is household and the Third Activity is room.

FIFTH
ACTIVITY
FOR
SKILL A

Look at the National Population Density chart. The numbers are given for the number of people per square kilometer. ¿Cuál es la parte más poblada en Asia? ¿Cuál es la menos poblada? ¿Cuál es la más parecida a Puerto Rico?

NATIONAL POPULATION DENSITY

(Source: United Nations Demographic Yearbook 1970)

COUNTRY	DENSITY	COUNTRY	DENSITY
Argentina.....	6	Mexico.....	26
Australia.....	2	Mongolia.....	1
Austria.....	89	Netherlands.....	319
Belgium.....	317	Norway.....	12
Bolivia.....	4	Peru.....	11
Brazil.....	11	Philippines.....	128
Chile.....	13	Poland.....	105
China.....	79	Portugal.....	105
Colombia.....	19	Puerto Rico.....	319
Cuba.....	73	Spain.....	66
Czechoslovakia.....	113	Sweden.....	18
Denmark.....	114	Switzerland.....	152
Finland.....	14	Taiwan.....	390
France.....	93	Thailand.....	70
Germany, East.....	150	USSR.....	11
Germany, West.....	240	United Kingdom.....	228
Greece.....	67	United States.....	22
Guatemala.....	47	Venezuela.....	11
Hong Kong.....	3955	Vietnam, North.....	133
Hungary.....	111	Vietnam, South.....	105
India.....	168	Yugoslavia.....	80
Indonesia.....	31	Zaire.....	7
Italy.....	178	Zambia.....	6
Japan.....	280		

NOTE: The density is given in persons per square kilometer.

SIXTH
ACTIVITY
FOR
SKILL A

Using the National Population Density chart, the students should categorize all the countries according to different criteria. Some possibilities include:

1. The Seven Continents of the World
 - a) Africa
 - b) Antarctica
 - c) Asia
 - d) Australia
 - e) Europe
 - f) North America
 - g) South America

NOTE: Not all the continents are represented in the chart given.

2. The countries in Latin America
3. The countries with more people than Puerto Rico
4. The countries according to their density in ascending order.
For example, Mongolia being the least dense will come first while Hong Kong being the most dense will be last on the list.

The teacher should encourage the students to think of as many ways as possible to utilize the data given on the chart. Bar graphs and number lines are some of the possibilities.

SCIENCE CURRICULUM FOR GRADE THREE

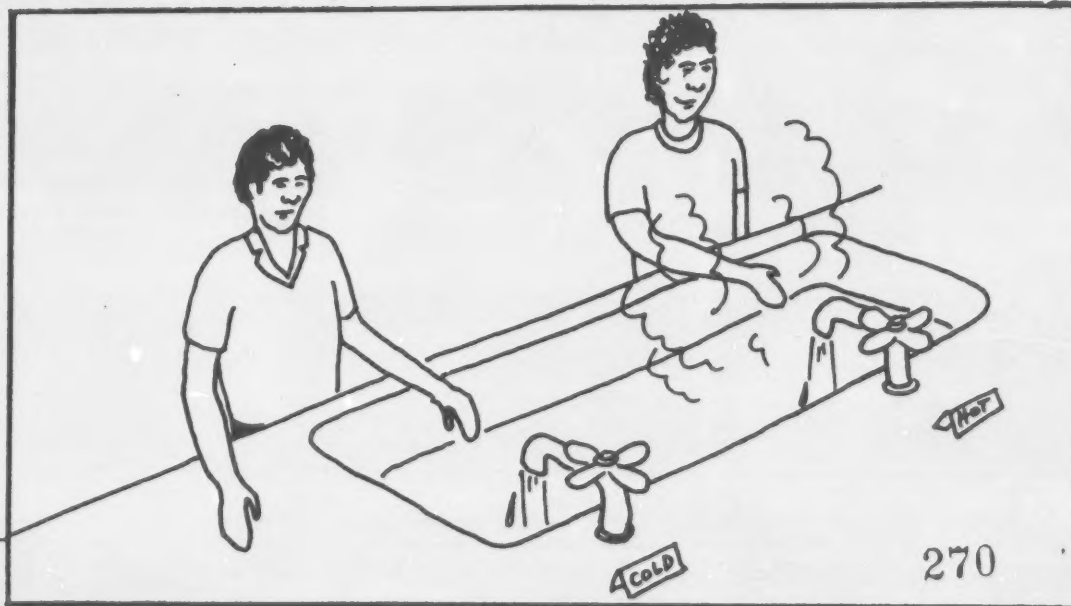
UNIT V: ASIA

SKILL B: Is able to know that air holds moisture: hot air holds more moisture than cold air.

VOCABULARY: moisture
humidity
relative humidity

**FIRST
ACTIVITY
FOR
SKILL B**

Run hot water from the faucet and ask some students to put their hands over the path of the rising air (steam) making sure they do not touch the running water itself. Repeat the process except use running cold water from the faucet. Ask the students to compare the wetness of their hands. You might want to vary this experiment by varying the temperature of the water from the faucet - cold, warm, very warm, hot. Each student should have the opportunity to put his hand over both the hot and cold air paths. Make sure paper towels are supplied so that students can dry their hands from one experiment to the next. See if the students can draw the conclusion that hot air holds more moisture than cold air. Humidity is the amount of moisture that the air contains. If faucets are not available, use a thermos of hot water and a thermos of cold water.



SECOND
ACTIVITY
FOR
SKILL B

Ask the students to look in their local newspaper for the humidity of the day. Keep a humidity chart for one week. The figure in the paper is actually relative humidity. The comparison between the amount of moisture (water vapor) actually present in the air, and the amount the air could hold at that temperature is called relative humidity. For example, if the amount of water vapor in the air is exactly one-half the amount the air can hold at that temperature, we say the relative humidity is 50%. Ask the students to look up some of the relative humidity figures in some Asian countries in the Average Daytime Humidity Table. Usually daytime humidity figures are given. Humidity figures are generally lower in the evenings. ¿Qué país en Asia tiene una humedad relativa parecida a la que encontraron en el estudio?

TABLE OF AVERAGE DAYTIME HUMIDITY
FOR JANUARY AND JULY IN CERTAIN
EUROPEAN CITIES

	January	July
	Daytime Humidity	Daytime Humidity
Colombo, Sri Lanka	74%	80%
Delhi, India	53%	68%
Rangoon, Burma	72.5%	85%
Bangkok, Thailand	68%	68%
Singapore	82%	78%
Manila, Philippines	79%	85%
Tokyo, Japan	35%	66.5%
Hong Kong	73%	82%

THIRD
ACTIVITY
FOR
SKILL B

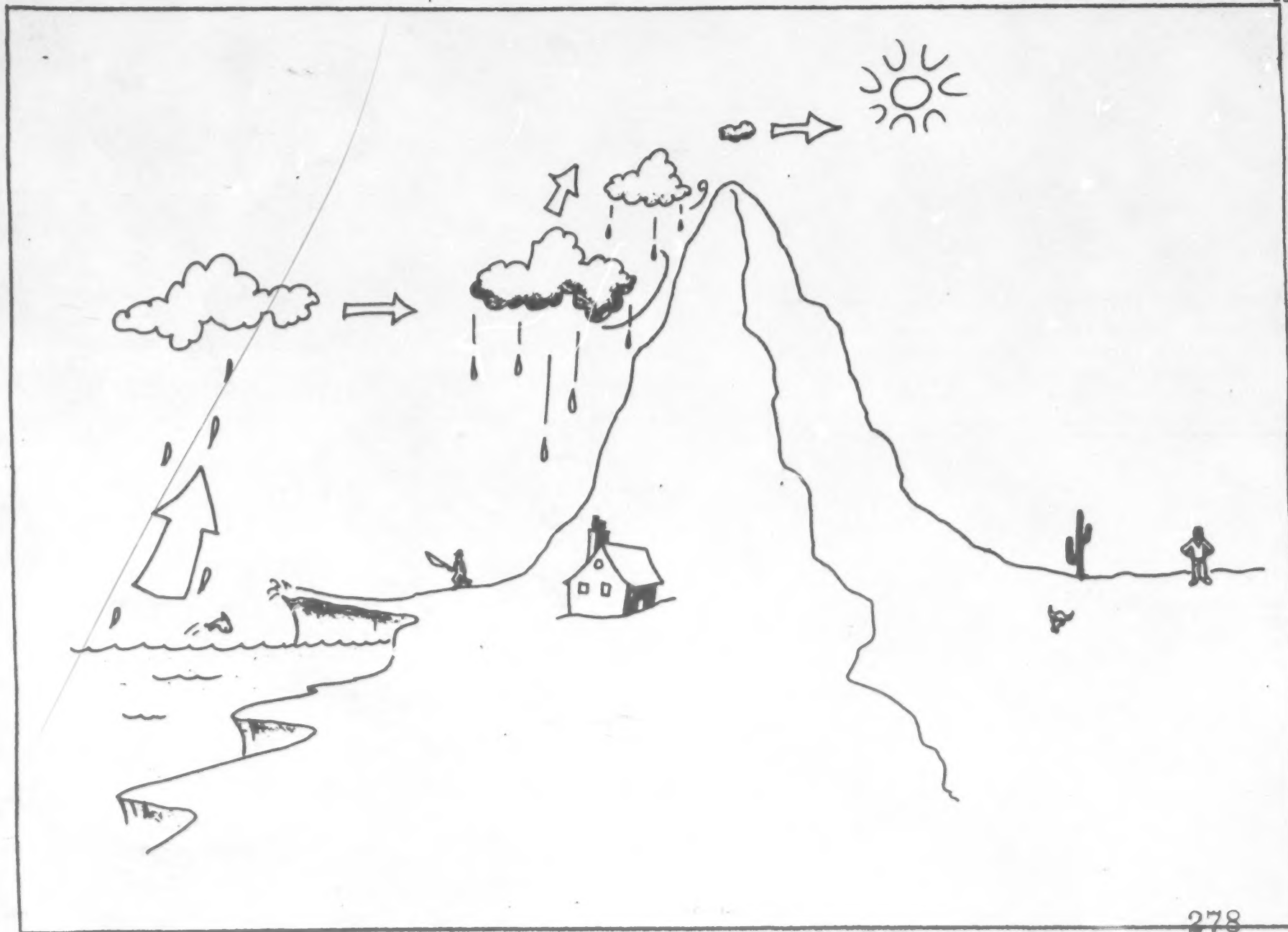
Have the students list the countries in order of descending humidity figures for the month of January and for the month of July. Descending humidity figures mean the highest humidity figure comes first and the lowest comes last. Most people find high humidity in the air quite uncomfortable. Assuming this to be true, which places would be most uncomfortable to visit in January? In July? Si fueras a visitar Tokio, Japón, ¿harías tu viaje en enero o en julio? This might be a good time to bring out the fact that although humidity is an important factor in the weather, the temperature is also very important. Tokyo's average January temperature is 2.2° C (37.9°F) while its average July temperature is 24.4° C (76.0°F). Taking both temperature and humidity into consideration, the decision to visit Tokyo in January or July becomes more difficult.

SKILL C: Is able to know that the weather is dependent upon air, water, wind, and sun.

VOCABULARY: sea level
atmosphere
moisture
air
water
sun
wind
weather

BACKGROUND

Weather is the condition of the atmosphere at any given time and place. Most of the changes in weather are caused by moving air. Warm air over the sea or bodies of water takes up moisture and then may move over the land. The path of the moisture-laden air may be blocked by mountains. The air then rises to pass over the mountains. The upper air is cooler than air near sea level. As the air rises it is cooled by the colder atmosphere. Cool air cannot hold as much moisture as hot air so the air rising over the mountains must get rid of some of its moisture. The moisture in the air is released by rainfall. Consequently, the inhabitants of valleys and the mountainside facing the direction of the damp air get rainfall. Once the air has passed over the mountain and lost most of its moisture it becomes dry and clear. People living on the leeward side of the mountains always seem to get clear weather- very little rain. Leeward side is the side towards which the wind blows.





FIRST
ACTIVITY
FOR
SKILL C

Ask the children to explain the following picture using the following terms: wind, direction, sea, mountain, moisture-laden air, dry air, rain, water, sea level, atmosphere.

SECOND
ACTIVITY
FOR
SKILL C

Have the children choose various locations to live from the picture in the First Activity. ¿Que clase de clima tendrán la mayoría del tiempo?

THIRD
ACTIVITY
FOR
SKILL C

Discuss with the students the following:

1. Which groups of mountains might affect the weather in Asia?
2. Which countries in Asia might they affect?
3. Which oceans, seas or bodies of water would affect the weather? Where?

The students do not have to know how the weather is affected by the above, just that the mountains and the bodies of water affect the weather.

SKILL D: Is able to know that dark-colored objects hold on to heat from the rays of the sun better than light colored objects.

VOCABULARY: absorption
heat
rays
exposure

**FIRST
ACTIVITY
FOR
SKILL D**

Roll a piece of white paper around a thermometer. Tape the end of the paper. Do the same with a piece of black paper of the same size. Remove both thermometers. Place both papers in the sun. After a few minutes the black paper will feel warmer than the white paper. Confirm this by measuring the temperature of the rolled papers after having exposed them to the sun for two minutes, five minutes, and ten minutes.
Make a chart of the time of exposure to heat (minutes) and temperature for both papers.

**SECOND
ACTIVITY
FOR
SKILL D**

Ask the students to bring in different kinds and colors of materials. Place the materials in the sun for different durations of time (five minutes, ten minutes, fifteen minutes). Can you feel the difference in warmth? What kinds of clothing and what colors would be best for people living in the tropics? The mountains? Winter? Summer?
NOTE: It is known that over exposure to the sun may lead to skin cancer. Although light colored clothing absorbs less heat and is cooler in the warm weather, it also permits more ultraviolet rays to penetrate the body. Therefore, dark colored clothing, although warmer, gives you more protection from the sun's rays.

**THIRD
ACTIVITY
FOR
SKILL D**

Measuring the difference in heat absorption of light colors and dark colors. **MATERIALS NEEDED:** two white cups (paper or styrofoam), thermometer, black paint or black marker

Paint one of the white cups black. Fill both cups with water of the same temperature. Place these cups in the sun. After 30 minutes and 60 minutes, test the temperature of water in each cup.

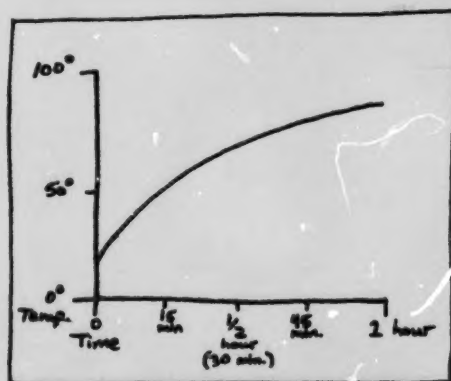
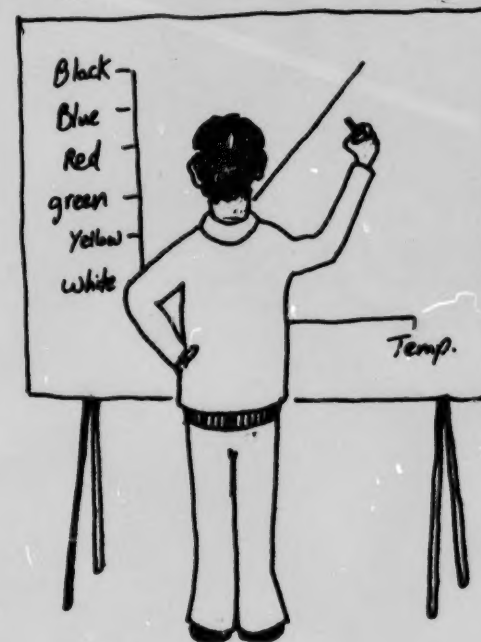
SCIENCE CURRICULUM FOR GRADE THREE

UNIT V: ASIA

FOURTH
ACTIVITY
FOR
SKILL D

ELABORATION OF ACTIVITY TWO

- a. The teacher may wish to reinforce graphing and some of the method used in science by asking students to compare the heat absorption of five different colors, (e.g. white, yellow, green, blue and red). This may be done by painting the cups in those colors. Ask the students to graph the results.



- b. The students may be asked to measure the temperatures of the two cups at ten or fifteen minutes time intervals for about one hour. The results should be graphed. The graph may look something like this.

SKILL E: Is able to describe the characteristics of some organisms of the desert.

SKILL F: Is able to identify the ways organisms adapt to the desert environment.

VOCABULARY: adapt
desert
arid
terrarium

**FIRST
ACTIVITY
FOR
SKILL E**

Locate on the map of Asia the areas where there are deserts. (For example, the Gobi desert in Mongolia and the Rub Al Khali in Saudi Arabia). Discuss the nature of deserts, asking, for example: ¿Cuáles son algunas de las características de un desierto? ¿Es húmedo o seco? ¿Por qué?

SECOND
ACTIVITY
FOR
SKILL E

Show the students pictures of plants and animals of those arid regions (cacti, thistles, thorny plants, lizards, insects, etc.). In order to stimulate discussion, ask questions such as? ¿Has visto plantas y animales como éstos? ¿Donde los has visto? ¿Cómo es el sitio donde viven? ¿Crecen muchas plantas en este sitio? ¿Es un sitio fresco? ¿Es un sitio donde hace mucho calor?



FIRST
ACTIVITY
FOR
SKILL F

Show the class a live cactus plant grown in a pot and any other non-desert plant. Ask the students to describe these two types of plants. Ask, for example? ¿Como es el tallo? ¿Como son las hojas? ¿Por qué tendrá espinas? Show the students how to cut the stem transversally so as to expose a cross-section of the stem. Invite them to observe the inside of the stem and to draw inferences about its interior. Ask them to answer the following questions: ¿Cómo lo encuentras? ¿Qué tendrá dentro? ¿Por qué será tan grueso? ¿Cómo se protegen los animales del desierto cuando no hay agua?



SECOND
ACTIVITY
FOR
SKILL F

Prepare a terrarium with plants and animals of the desert, in the following manner:

- a) Put small stones or sand in a wide-mouthed glass container. (It is necessary to wash and dry the sand, some days before using it for the terrarium).
- b) Plant cacti and other desert plants in the sand.
- c) Put in small desert animals.
- d) Cover the terrarium with a fine metal screen.

For purposes of discussion, ask the class: ¿Debemos echarle agua al terrario? ¿Cuánta? ¿Mucha? ¿Poca? ¿Donde debemos colocar el terrario? ¿En un sitio seco? ¿En un sitio frío? ¿En un sitio caliente?

SCIENCE CURRICULUM FOR GRADE THREE

UNIT V: ASIA

SKILL G: Is able to know that objects heavier than water will sink and objects lighter than water will float.

VOCABULARY: buoyancy (Buoyant Force)
volume vs. weight

BACKGROUND

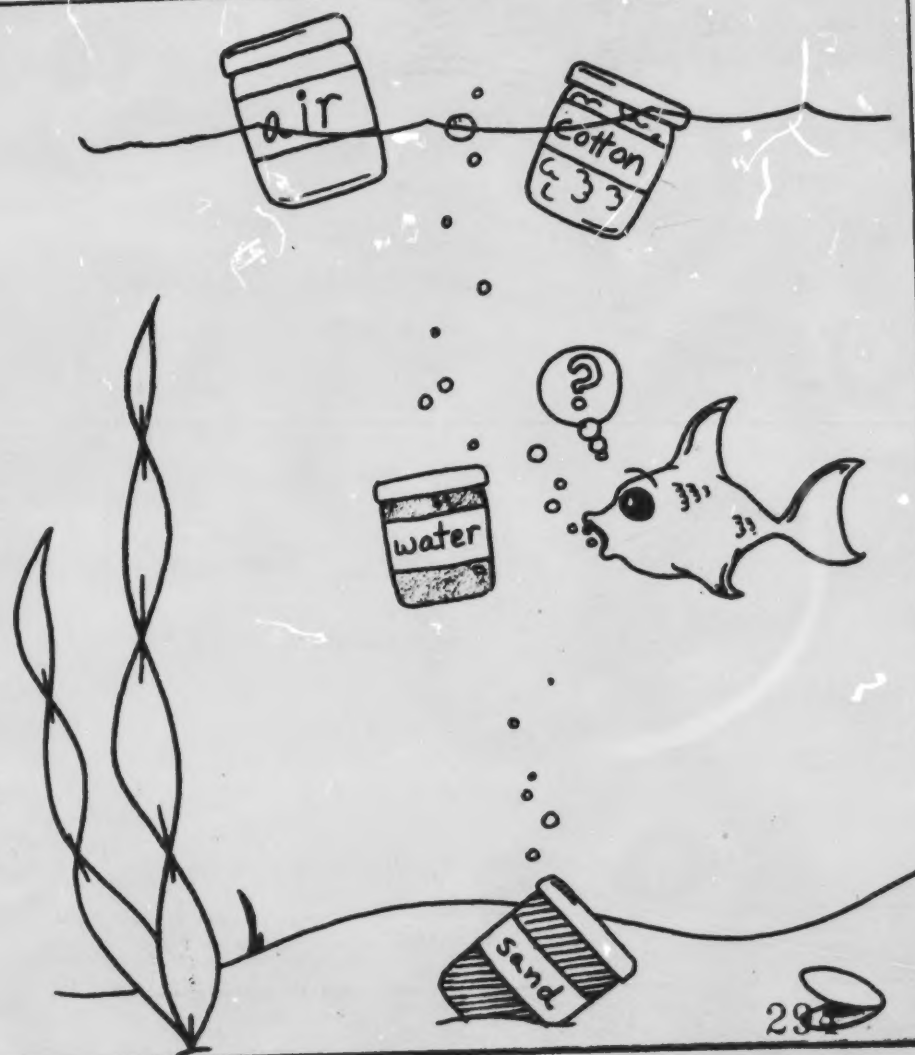
The force which seems to lift us up a little in water is called a buoyant force. Buoyancy is the ability or tendency to float or rise in liquid.

**FIRST
ACTIVITY
FOR
SKILL G**

Let the children put all different kinds of objects in water and make a list of the ones which float and a list of the ones which sink. (e.g. pencils, rocks, pebbles, cork, keys, paper clips, etc.).

**SECOND
ACTIVITY
FOR
SKILL G**

Fill baby food jars with sand, cotton, water, and air. Cover tightly. Let the children determine which will float and which will sink.



THIRD
ACTIVITY
FOR
SKILL G

The children should place small objects which usually sink into baby food jars. Some of the objects used may be paper clips, keys, pebbles, nickels, pennies, etc.

Now the volume occupied by each object (key, pebble, paper clip) can be thought of as the entire baby jar. Stress to the children that a baby food jar with keys in it will remain afloat as long as no water gets into the jar. As soon as water replaces the air that was in the jar, the entire jar will sink because now the weight of the water plus the object in it, plus the weight of the jar itself is heavier than the water occupying an equal volume. The teacher may wish to bring out the buoyant force of the water which makes us feel lighter in water. The concept of whether an object floats or not is not only determined by its weight but also by the volume it occupies. Even though the sampans in Asia are heavy, they have a lot of volume. Thus people are able to live in sampans and conduct business from them.



UNIT VI: ESKIMOS

- SKILL A: Is able to know that when ice changes to water it is a physical change.
- SKILL B: Is able to know that ice is lighter than water and occupies more volume than water.
- SKILL C: Is able to locate and identify on the globe the following: North Pole, South Pole, Equator, Tropic of Cancer, Arctic Circle, Antarctic Circle, latitudinal lines, longitudinal lines, International Date Line, Northern Hemisphere, and Southern Hemisphere.
- SKILL D: Is able to get an idea how the earth moves in two ways at the same time.
- SKILL E: Is able to infer the density of population of certain Eskimo towns.
- SKILL F: Is able to identify and know about some animals that are common to the livelihood of Eskimos.

SKILL A: Is able to know that when ice changes to water it is a physical change.

VOCABULARY: physical change

BACKGROUND

Physical changes are changes which are not permanent and the substance does not lose its identity.

FIRST
ACTIVITY
FOR
SKILL A

The weight of water when it changes from solid to liquid and back to solid again.

Weigh the plastic cup filled with ice cubes on a kitchen scale. Make sure the outside of the cup is dry. Leave the cup of ice in a warm place until all ice has melted into water. Carefully, weigh the cup of water: ¿Cuál pesa más, el vaso con los cubos de hielo, o el vaso con el agua? ¿Pesaran lo mismo?

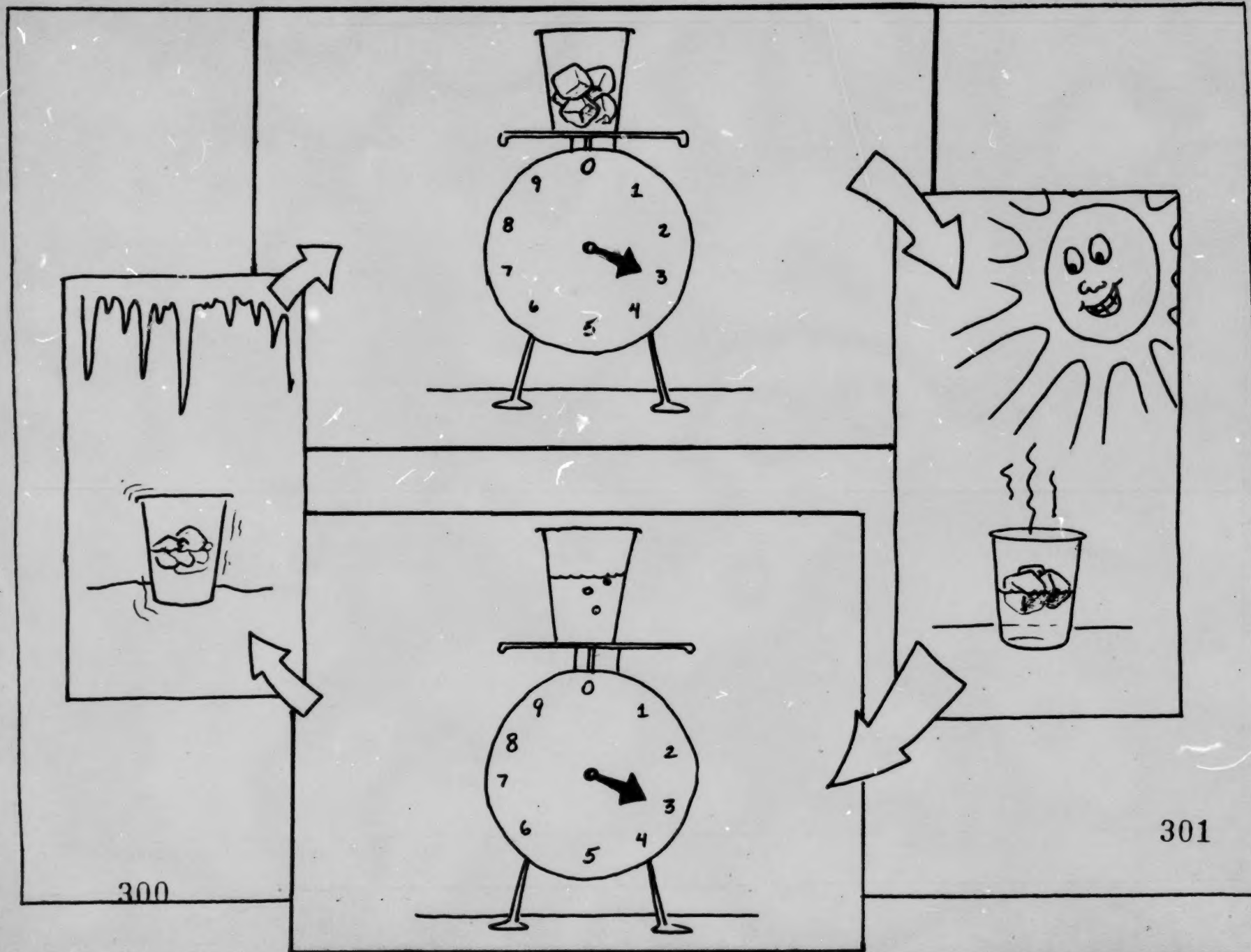
Put the cup of water in the freezer and leave it there all night. In the morning the water will be frozen. Weigh the cup before the ice starts to melt. What is the weight of the cup now? Compare all three weights.

WEIGHT

298

cup + ice cubes
cup + water (melted ice cubes)
cup + ice

299



SECOND
ACTIVITY
FOR
SKILL A

Using non-carbonated fruit juice or drinks such as Kool-aid, Hi-C, etc. and paper or plastic cups, distribute half a cup of juice to each student. Have the student write his name on the cup, taste the juice, mark the level of the juice in his cup, and weigh the cup with its contents.

Put the cups in the freezer. After the juice has frozen, ask the students to mark the level of their juice cups. Weigh the cups. Now the students are to place their cups in a warm place so that their frozen juice can melt. ¿Sabe el jugo mejor antes de congelarse, después de congelado? After the frozen juice has melted the students will mark the level of the juice and finish off their experiment by drinking their juice.

Was there a difference in taste, weight or level on the cup (volume) before and after freezing? Do you realize that juice is made up mostly of water so that like water, a physical change occurs when it goes from liquid to solid (ice)?



SKILL B: Is able to know that ice is lighter than water and occupies more volume than water.

VOCABULARY: buoyancy
volume
density
lighter
ice floe
occupy

BACKGROUND

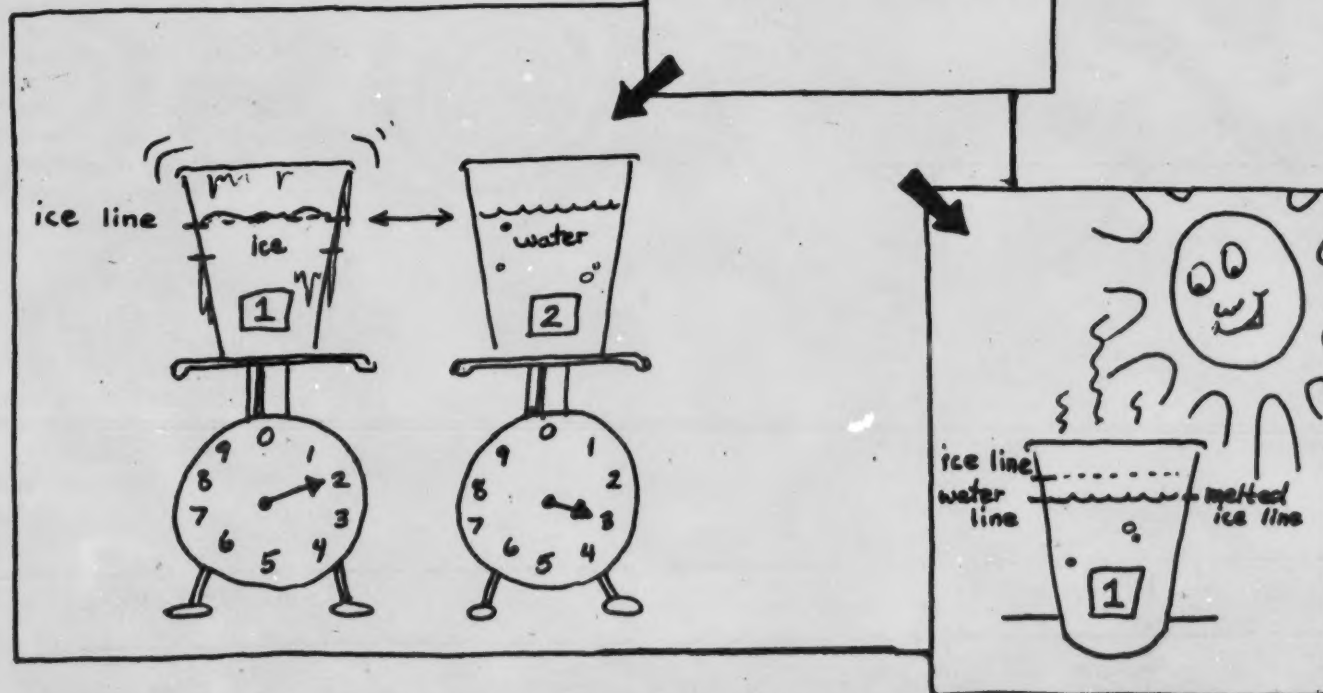
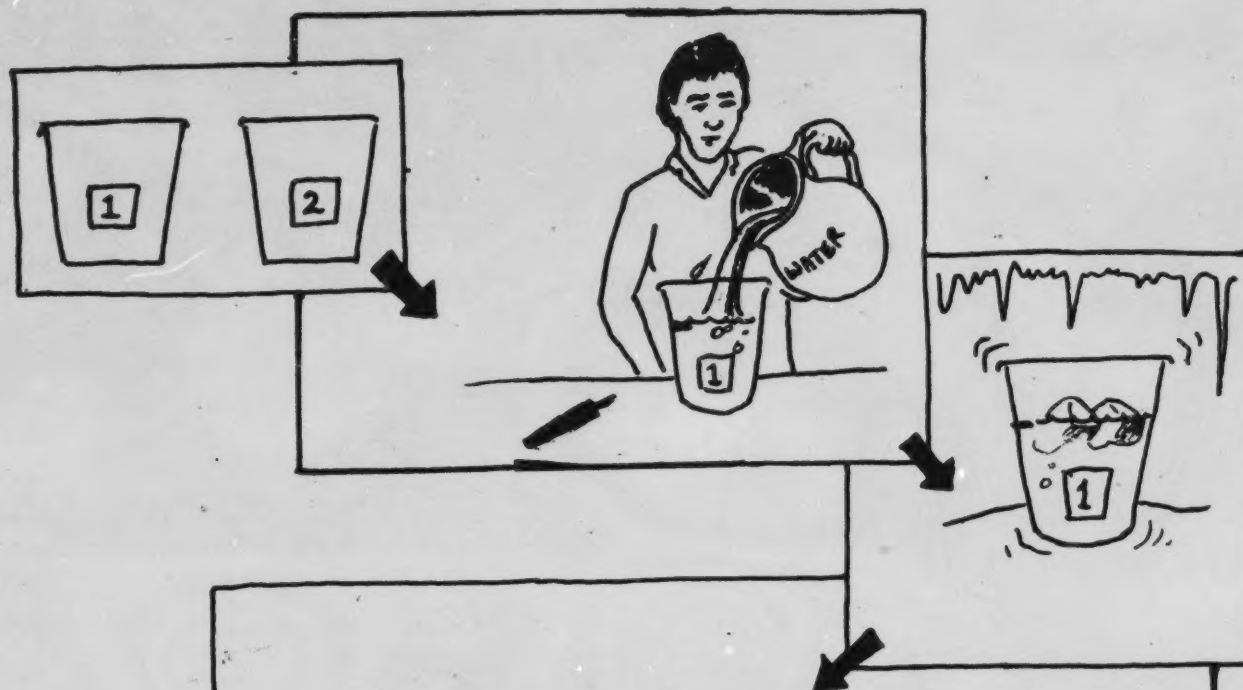
One of the occupations of Eskimos is to hunt for walrus. The walrus meat, particularly internal organs, make excellent meals for Eskimos. During these hunts which take place from boats, the Eskimos often sight walrus sitting on ice floes (or large ice packs). These ice floes often move at the rate of five miles per hour and if the hunters are not careful they can get carried out far into the sea without realizing it.

FIRST ACTIVITY FOR SKILL B

Part I: Fill a cup (#1) with some water (about half) and mark the space (or volume) the water occupies. Put cup #1 into the freezer. After the water has frozen, make another mark on cup #1. Let the ice in cup #1 melt and check its mark. Compare the space occupied by the water and by the ice. Bring out the fact that the water and the ice are really the same substance in different states. Because they are really identical, they have exactly the same number of molecules. The same number of molecules occupying different spaces (or volume) makes ice and water have different densities. ¿Están las líneas o marcas en el mismo lugar? ¿Cuál ocupa más espacio; el agua o el hielo?

Part II: This should be done at the same time as Part I. Fill a second cup (#2) (same size as that in Part I) with enough water so that it occupies the same space as the ice line in cup #1. ¿Tienen los vasos las marcas en el mismo nivel? Before the ice starts to melt in cup #1, weigh it (cup #1 and ice). Also weigh cup #2 and water. ¿Pesán iguales los dos vasos? ¿Cuál pesa más?

OBJECT	WEIGHT
cup #1 + ice	
cup #2 + water	



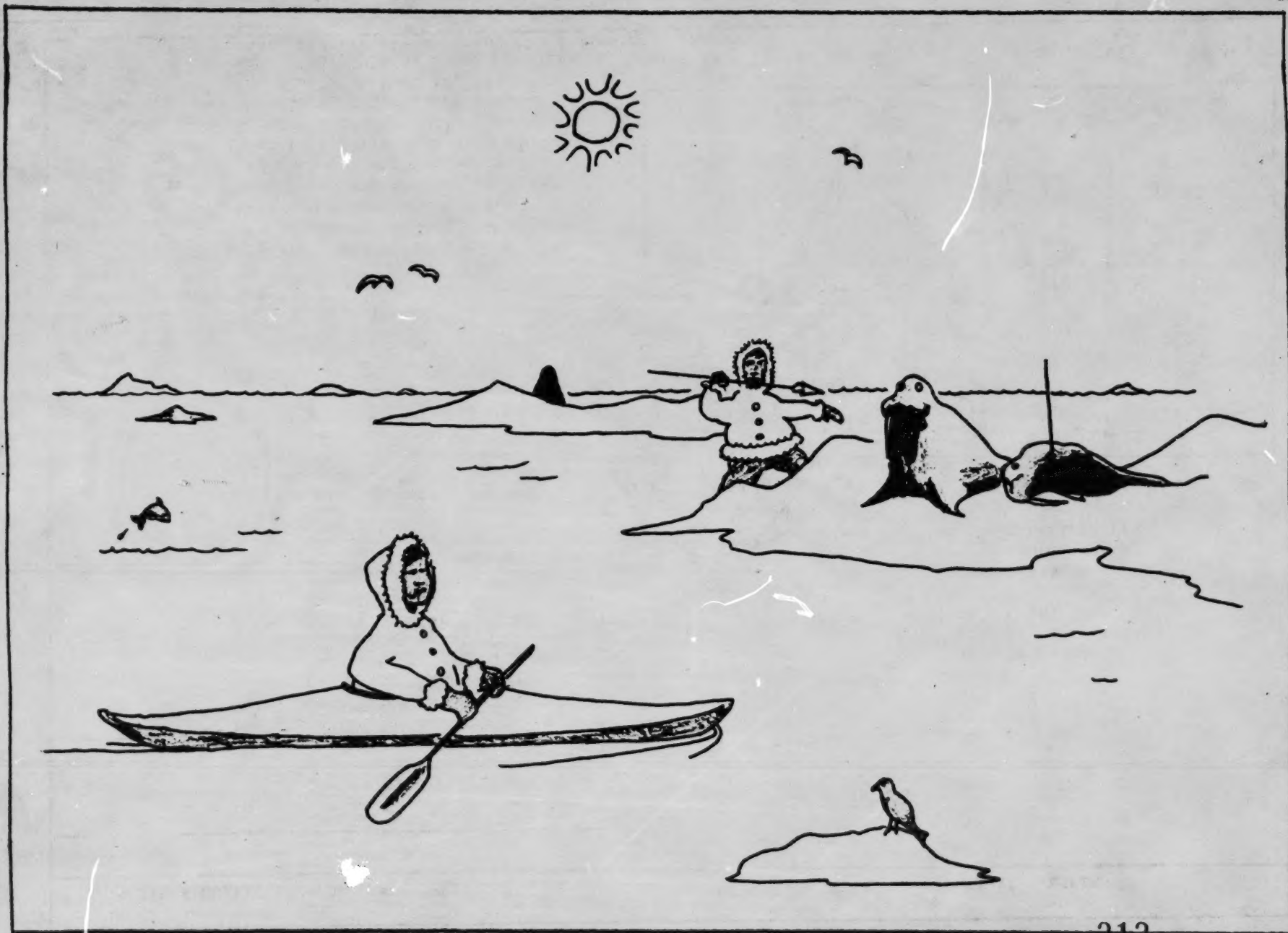
SECOND
ACTIVITY
FOR
SKILL B

Prepare two pans of water, one cup of water and one cup of ice cubes. Pour the cup of water into one pan and the ice cubes into the other pan. ¿Qué le sucedió al agua del vaso cuando se echo en el envase con agua? (The water from the cup mixed with the water in the pan. They are both of the same density). ¿Qué le sucedió al hielo cuando se echo al envase con agua? (The ice cubes floated on the top. Ice is lighter and is therefore less dense than water). It is important at this time to bring out that you are now dealing with density with respect to volume.



THIRD
ACTIVITY
FOR
SKILL B

Present pictures of a walrus hunt, walruses, boats, Eskimos and the sea with ice floes. Ask the children to describe the picture. ¿Por qué crees tú que el hielo flota en el mar?

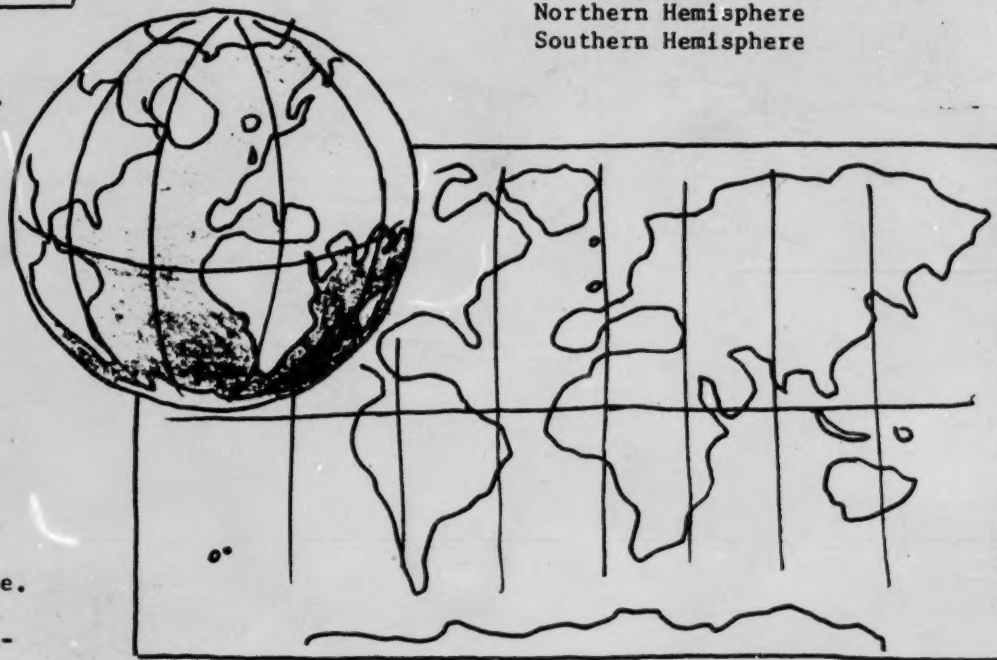


SKILL C: Is able to locate and identify on the globe the following: North Pole, South Pole, Equator, Tropic of Cancer, Arctic Circle, Antarctic Circle, latitudinal lines, longitudinal lines, International Date Line, Northern Hemisphere, and Southern Hemisphere.

VOCABULARY: globe
North Pole
South Pole
Equator
Tropic of Cancer
Tropic of Capricorn
Arctic Circle
Antarctic Circle
International Date Line
Northern Hemisphere
Southern Hemisphere

**FIRST
ACTIVITY
FOR
SKILL C**

Look at a flat map of a world. Locate each of the following: North Pole (the point farthest north on the earth), South Pole (the point farthest south on the earth), the Equator (an imaginary circle around the earth, equally distant at all points from the South Pole and the North Pole), Northern Hemisphere and Southern Hemisphere. The area above the Equator is called the Northern Hemisphere and the area below the Equator is called the Southern Hemisphere. Compare these places on a globe. Bring out to the children that the lines on the globe are continuous but not on the flat map. The globe is a more accurate representation of the earth than the flat map. This may be demonstrated clearly by doing the following:



Take an orange (or a grape fruit). Draw a rectangle on the orange. Peel the orange in a single piece from the center of the rectangle. Flatten the orange peel in such a way that the parts of the rectangle are on both edges. See illustration below.



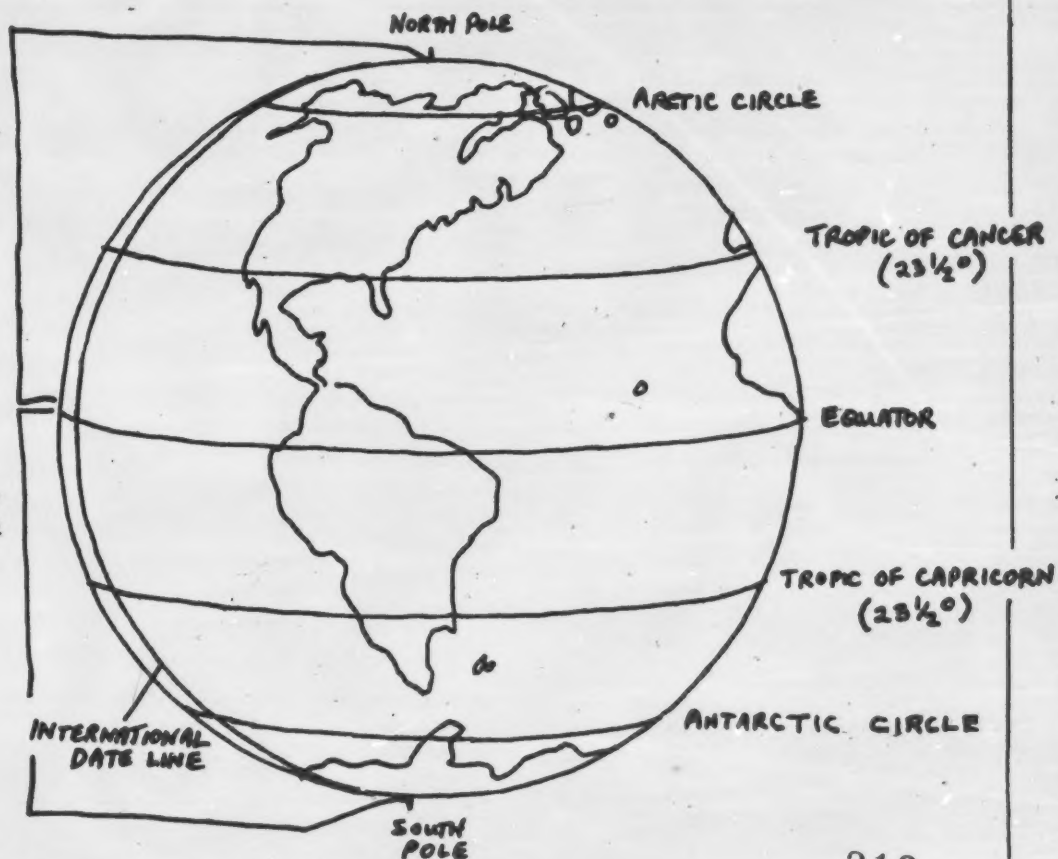
Can the children connect the fact that a location on the most eastern portion of the flat map is really right next to the location on the most western portion of the flat map?

SECOND
ACTIVITY
FOR
SKILL C

Locate on the globe all the areas that Eskimos may be found today. Ask the students to describe where the Eskimos live using the above vocabulary as points of reference. For example, some students may say: Eskimos may go fishing in the Bering Strait which is between 60 latitude and the Arctic Circle. Many Eskimos live north of the Arctic Circle. Some Eskimos may be found near 60 latitude and 150 longitude.

NOTE: There is no need at this point to teach the children about what the degrees in longitudinal and latitudinal lines mean. It is enough that they can locate these lines and the numbers on them. Latitudinal lines are parallel to the Equator (or go horizontally East/West on a flat map) while longitudinal lines are perpendicular to the Equator and go north and south on a flat map.

One will not find Eskimo towns near the Equator. An Eskimo will probably feel at home near the Antarctic Circle because it is very, very cold there. An Eskimo will probably find the temperatures near the Tropic of Cancer and Tropic of Capricorn too warm. ¿En qué lugar te encontrarías más cómodo?

NORTHERN
HEMISPHERESOUTHERN
HEMISPHERE

SCIENCE CURRICULUM FOR GRADE THREE

UNIT VI: ESKIMOS

SKILL D: Is able to get an idea how the earth moves in two ways at the same time.

VOCABULARY: axis
rotation
revolution
orbit

BACKGROUND

Most students at this time probable know that the Earth rotates to give us day and night. Now introduce the fact that the Earth is also going around the sun as it is rotating.

FIRST
ACTIVITY
FOR
SKILL D

Place a lamp on the floor to represent the sun. Draw a line with chalk around the lamp to represent the earth's orbit. Point out to the children that the earth's orbit is almost but not quite the shape of a circle. Have one student hold the globe and walk along the chalk line around the lamp while another student beside him/her rotates the globe.

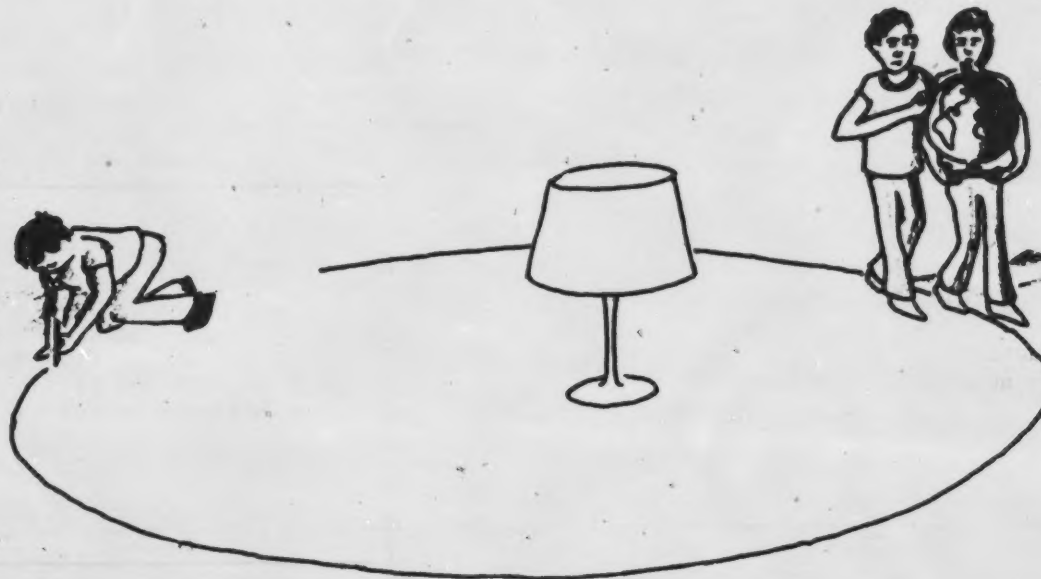
Use the following terms:

revolution - the movement of the earth

orbit - the path around the sun that the earth follows as it revolves around the sun.

rotation - the turning of the earth along its axis

axis - the point



SECOND
ACTIVITY
FOR
SKILL D

Using the same set-up as in the first activity, attach a small flag with tape on Barrow, Alaska on the globe where many Eskimos live. Barrow is Alaska's biggest and busiest Eskimo town, although its population is only about 1,300. It is the northernmost town in the U.S.A.

Rotate the globe around slowly as the globe travels the orbit around the sun. Is there a period where Barrow may be considered the Land of the Midnight Sun?

¿Hay algún momento en que la ciudad de Barrow pueda considerarse la "Tierra del sol de Medianoche"? ¿Hay algún periodo de completa oscuridad? ¿Cómo compara con Noruega?

¿Será la misma situación? Let the students explain the similarities between Hammerfest, Norway, and Barrow, Alaska.

SKILL E: Is able to infer the density of population of certain Eskimo towns.

VOCABULARY: density
population
northernmost

**FIRST
ACTIVITY
FOR
SKILL E**

Show the students the following data of towns where more than half the population are Eskimos.

<u>PLACE</u>	<u>POPULATION</u>
Barrow	1,300
Nome	less than 2,500
Ignaluk (village on Little Diomedes Island in the Bering Strait)	80

What can they infer from this data with respect to the density of population? Compare the data with the (1970-1972) population of the following: ¿Cuál es la ciudad más poblada?

<u>Connecticut</u>		<u>Puerto Rico</u>	
Hartford:	155,868	Adjuntas:	18,691
Bridgeport:	156,542	Utuaado:	35,494
New Haven:	137,707	Arecibo:	73,468
Waterbury:	108,033	Camuy:	19,922
		Cidra:	23,892
		San Juan:	463,242

SCIENCE CURRICULUM FOR GRADE THREE

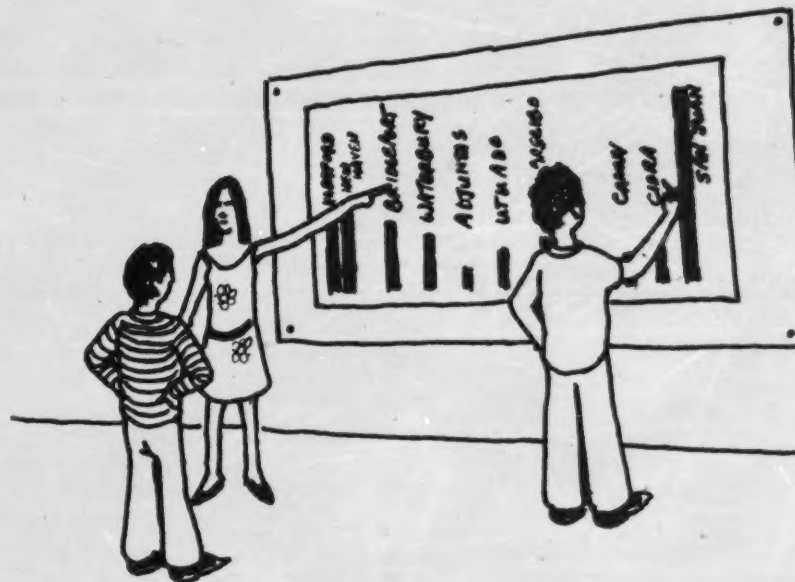
UNIT VI: ESKIMOS

SECOND
ACTIVITY
FOR
SKILL E

Using graph paper (or other appropriate paper), let each box represent 1,000 people. Have the students draw to scale the population of these various places. For example, one box plus a little more would represent the population of Barrow. Almost nineteen boxes would represent the population of Adjuntas in Puerto Rico.

Si observas la data (la información)
¿Cuál es la más fácil para recordar,
la tabla o la gráfica?

This is one of the reasons scientists
graph their data. Point out that
graphs are not the best way to rep-
resent data all the time, only some
of the time. In this case, graphs
are very useful.



SKILL F: Is able to identify and know about some animals that are common to the livelihood of Eskimos.

VOCABULARY:

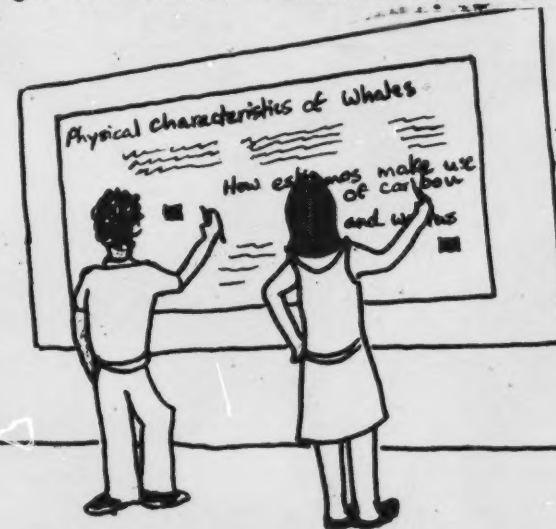
caribou	reindeer
walruses	migrate
seals	rangeland
whales	predecessors
mammals	Ice Age
warm-blooded	
blubber	
ascending order	
descending order	

BACKGROUND

About one fifth of the Alaskan population are Eskimos and Indians. Eskimos traditionally have been hunters. The caribou is a native cousin of the reindeer. It migrates through rangelands leading tame herds away. The caribous probably led the Eskimo predecessors from across Asia to North America. Geologists have found that as recently as 10,000 years ago, a large area between Siberia and Alaska was above water. Eskimos hunt for caribous, whales, walruses and seals.

**FIRST
ACTIVITY
FOR
SKILL F**

Show the students pictures of the caribou, the walrus, the seal and the whale. Mention several physical characteristics, natural habitat and enemies of these animals. Ask the children to make a chart to see how the Eskimos make use of these animals.

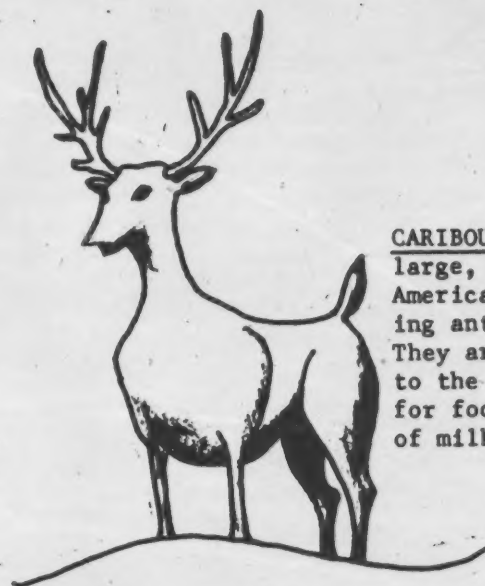


WALRUS: either of two massive sea mammals native to the North Atlantic, related to the seals and having two tusks projecting from the upper jaw, a thick mustache, a very thick hide, and a heavy layer of blubber.* They feed upon mollusks, crustaceans and worms.

* blubber- thick layer of fat which protects the animals' bodies from the cold ocean water.

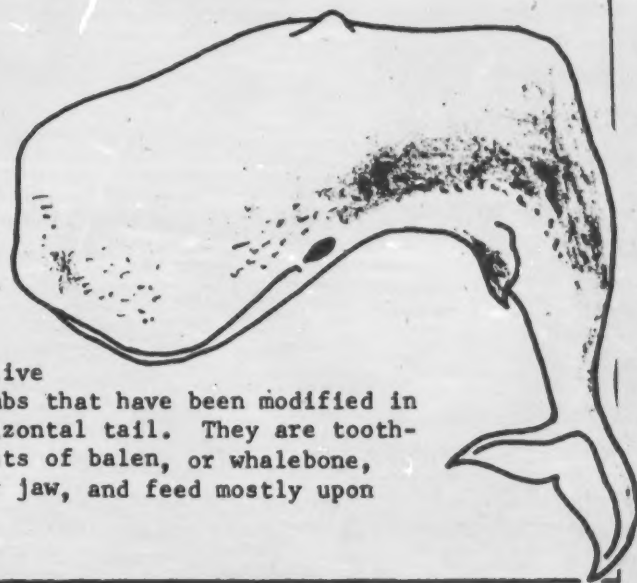


SEAL: any of various sea mammals with a torpedo-shaped body, a doglike head, and four webbed feet or flippers; they live in cold or temperate waters and eat chiefly fish.



CARIBOU: any of several large, northern North American deer with branching antlers in both sexes. They are closely related to the reindeer which graze for food and are sources of milk, meat and hide.

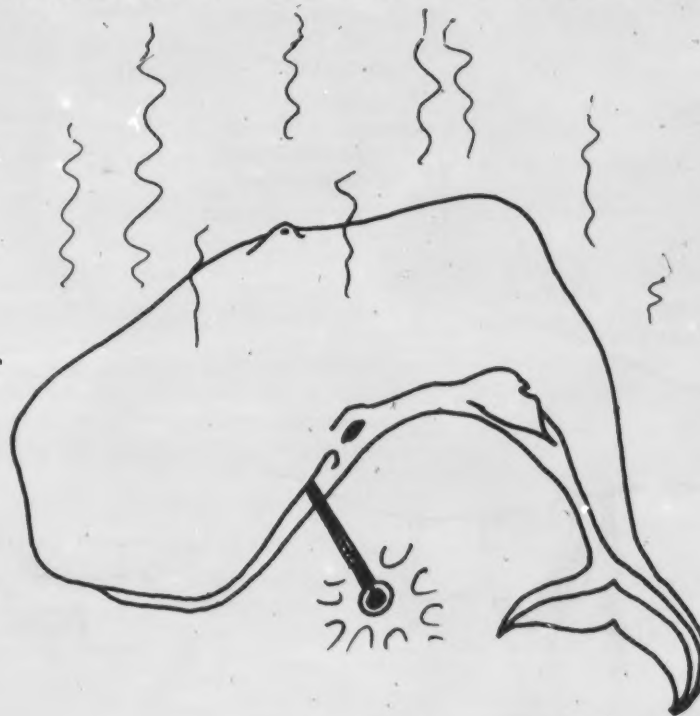
WHALE: any of various large, warm-blooded, fishlike mammals, especially as distinguished from the smaller dolphins and porpoises that breathe air, bear live young and have front limbs that have been modified in flippers and a flat horizontal tail. They are toothless species having sheets of balen, or whalebone, suspended from the upper jaw, and feed mostly upon fish.



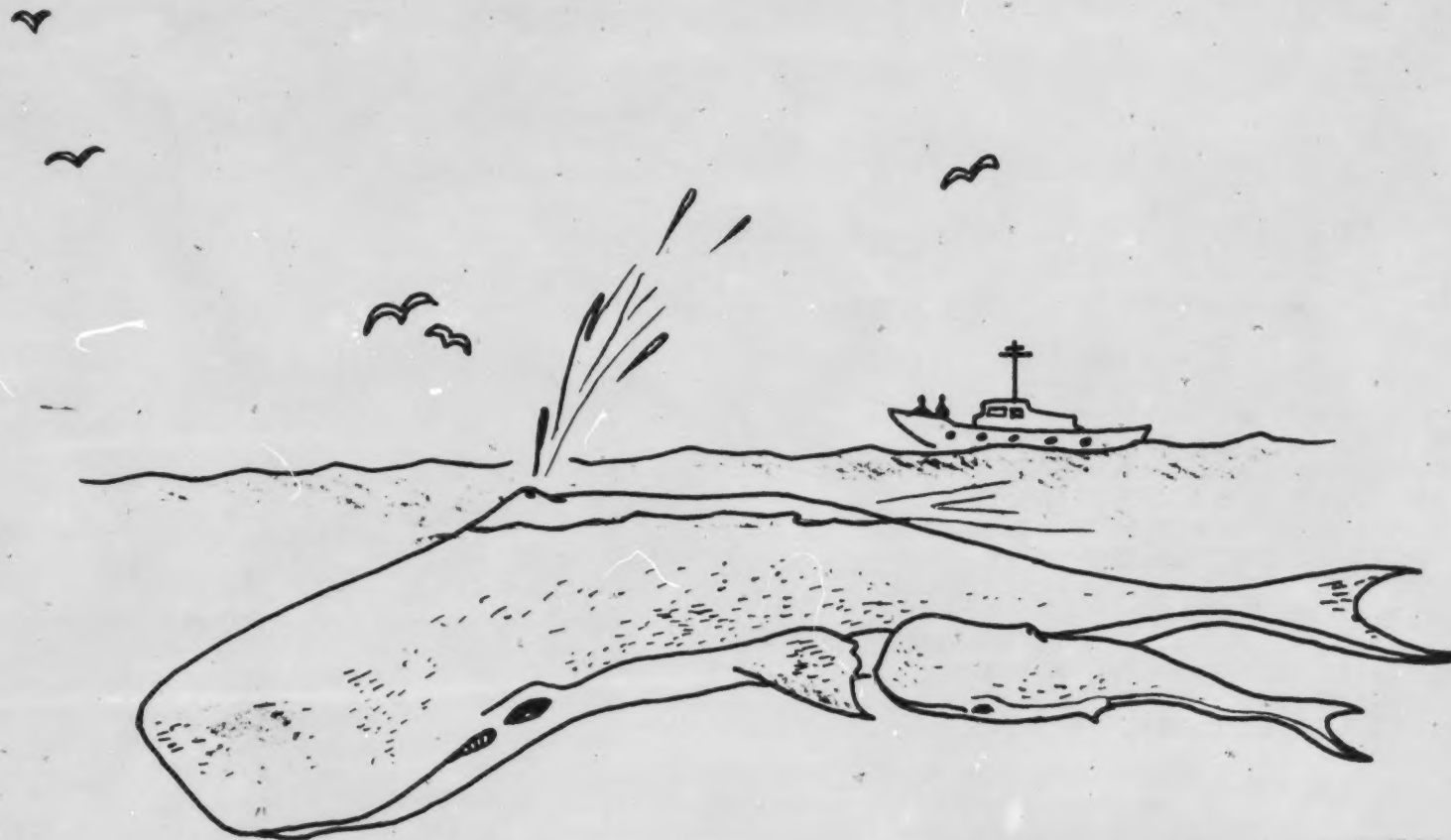
SECOND
ACTIVITY
FOR
SKILL F

Present pictures of whales which demonstrate some of the characteristics of mammals. ¿Cuáles son las características de los mamíferos? Menciona otros mamíferos que viven en la tierra. ¿En qué se parecen ambos?

Whales are
warm-blooded.



Whales are true mammals. Baby whales are called calves and are fed milk from their mother's bodies. Most have hair in the form of scattered bristles. They breathe air and usually surface every 20 minutes. After surfacing, whales breathe out air from their lungs through a blow-hole on top of their heads. This blast of warm air vaporizes when it reaches the colder surface air and looks like a spout of water.



THIRD
ACTIVITY
FOR
SKILL F

Present to the students some sizes and weights of these animals. Have the students graph (bar graph) their weights in ascending order and in descending order. ¿Cuánto tú pesas? ¿Cuánta mides? ¿Cuántas veces cabe tu peso en el peso de la ballena? ¿Cuántas veces cabe tu estatura en la estatura de la ballena?

<u>ANIMAL</u>	<u>SIZE</u>
Caribou	140 cm high at shoulder
Harbor Seal	150 cm long
(common seal)	
Blue Whale	
(Adult)	3,050 cm long
(Baby)	700 cm long
Bottle-Nose Whale	
(Adult)	900 cm long
(Baby)	30 cm long
Sperm Whale	1,800 cm long

<u>ANIMAL</u>	<u>WEIGHT *</u>
Eared Seal	818 kilograms
Harp Seal	300 kilograms
Bottle-Nose Whale	1200 kilograms
Blue Whale	120,000 kilograms

* At this point, it is sufficient to tell the students that the kilogram is a measure of weight used by scientists and European countries. There are 2.2 pounds in a kilogram.

FOURTH
ACTIVITY
FOR
SKILL F

Let each student represent his/her weight/height by one block. How many blocks are necessary to represent the weight/height of the caribou, whale, seal, or walrus?

UNIT VII: AMERICAN INDIANS

- SKILL A: Is able to know how clouds are formed.
- SKILL B: Is able to know and identify four basic types of clouds and the symbols used to represent them: cumulus, stratus, cirrus, and nimbus.
- SKILL C: Is able to understand what causes rain.
- SKILL D: Is able to understand why it does not rain constantly from all clouds.
- SKILL E: Is able to make and use a rain gauge.

SKILL A: Is able to know how clouds are formed.

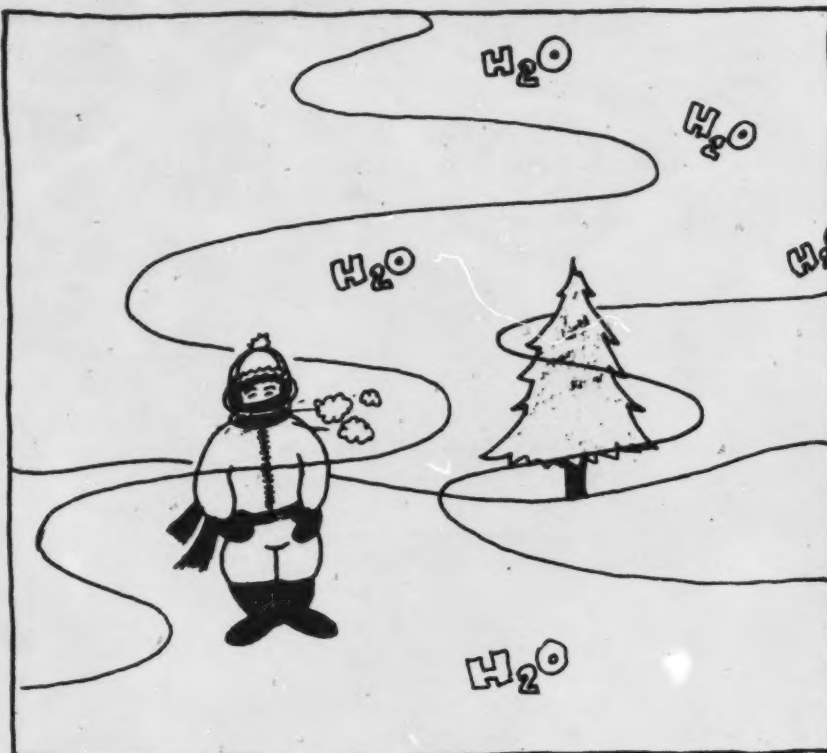
VOCABULARY: saturation point
condenses
condensation

**FIRST
ACTIVITY
FOR
SKILL A**

Recall the experiment dealing with air holding moisture (Unit V: Asia). It was discovered that hot air holds more moisture than cold air.

1. Ask the students whether they have ever experienced the feeling of having eaten so much that they just cannot take another bite. They have reached their "saturation point" as far as eating is concerned. The students may wish to discuss the differences in their own saturation points.

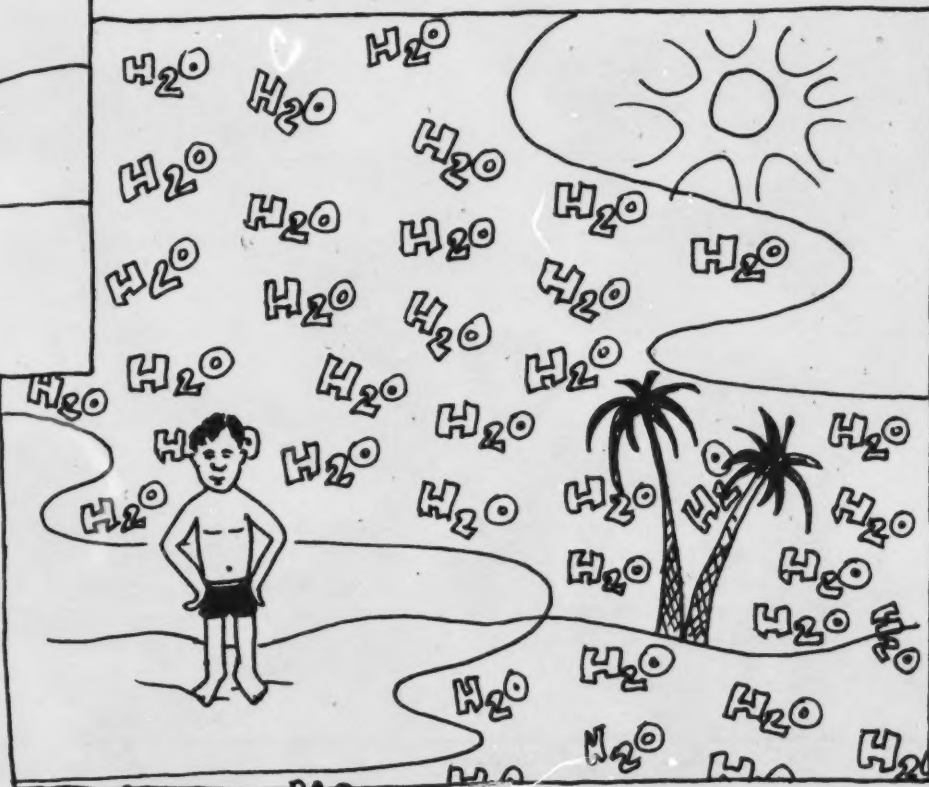




Cold Air and Hot Air have different saturation points.

H_2O is the chemical symbol for water.
Scientists write H_2O to mean water.

2. The amount of water that air can hold also has a "saturation point." Hot air can hold more water than cold air. Even so, the hot air reaches a point when it cannot hold any more water. This is hot air's saturation point. Hot air, warm air, cool air, and cold air all have different saturation points.



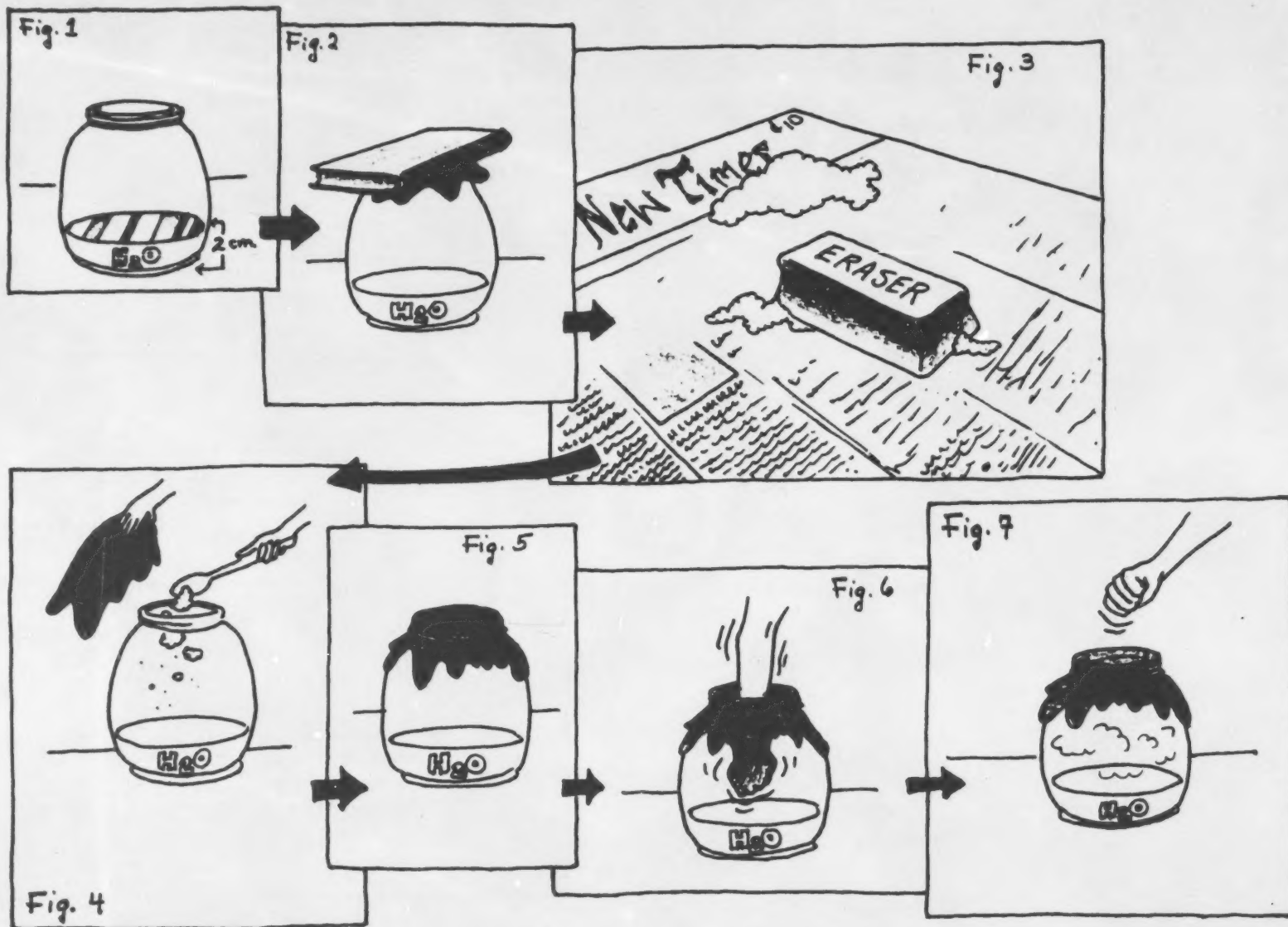
3. When air is cooled below its saturation point, the water in it condenses around specks of dust or around grains of sea salt tossed into the air by the ocean waves to form clouds. If this unit is covered during the cold winter months, have the children try this experiment. They should open their mouths to blow out warm moist air inside the classroom and repeat the same outside the school building in the cold. Ask them whether they observed any differences. What accounts for the differences?

THIRD
ACTIVITY
FOR
SKILL A

Make your own cloud. Let two or three students work together on this. Use a large glass jar with a mouth that is wide enough to fit your fist inside it. Wash the jar well and pour into it about two centimeters of water (Figure 1). Place a sheet of rubber (made from slitting a large balloon) over the mouth of the jar. Put a book on top to hold the rubber in place (Figure 2). Let it remain like this for at least 10 minutes. Collect into one place some chalk dust from a blackboard eraser (Figure 3).

To be done quickly: Remove the rubber sheet and spoon some chalk dust into the jar and then replace the rubber sheet over the mouth of the jar. To keep the rubber sheet in place, wrap a sturdy elastic band around the rim several times (Figure 4 and Figure 5). Now ask the student to push his fist against the rubber until it is actually inside the jar. This action compresses and warms the air in the jar, allowing the air to hold more water vapor (Figure 6). After about 15 seconds, tell the student to remove his fist. This action will suddenly cool the air in the jar, causing the water vapor molecules to condense around particles of chalk dust. As a result, the student will have caused a cloud to form inside the jar (Figure 7).

* Some students will probably ask why it is necessary to keep the rubber sheet and book over the jar for at least 10 minutes. Praise the students for asking such a good question. Explain that this allows the air inside the jar to become saturated with water molecules.



SKILL B: Is able to know and identify four basic types of clouds and the symbols used to represent them: cumulus, stratus, cirrus, and nimbus.

VOCABULARY: classify
symbols
cumulus
stratus
cirrus
nimbus
saturation point
water vapor

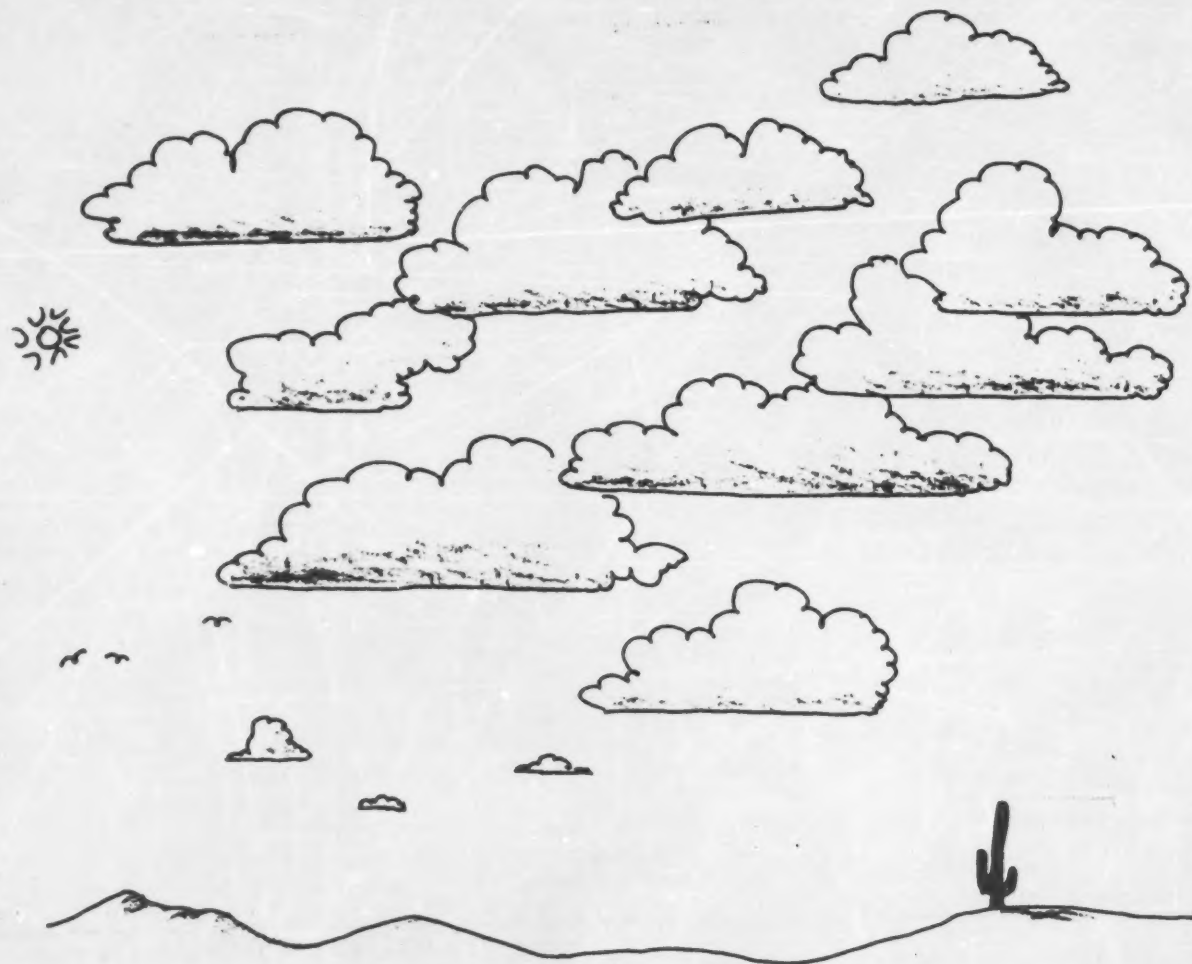
air currents
thunderclouds
vertical
alto

BACKGROUND

For centuries people have tried to make rain. The American Indians were no exception. They performed rain dances which sometimes worked and sometimes did not. By looking at the clouds before such a dance, a clever Indian could predict whether or not his dance would be successful.



The clouds that we normally see form in several ways but they are all formed by the same general process. (That is, the cooling of air below its saturation point and the water vapor in the air condenses.) Clouds are classified according to the way they are formed.



(1) Cumulus Clouds-
(Cumulus is a Latin word meaning "heap".) Cumulus clouds are often formed on hot summer afternoons by rising air currents. Cumulus clouds are usually 1200 to 1500 meters (4000 to 5000 feet) above the earth and look piled up and fluffy. These are the clouds you see on a fine day. Sometimes these clouds become thick and heavy with water indicating that they may develop into thunderclouds (Cumulonimbus Clouds). If you see many of them in the sky it might mean that it is going to rain.

(2) Stratus Clouds- ("Stratus" is a Latin word meaning "spreading out".)

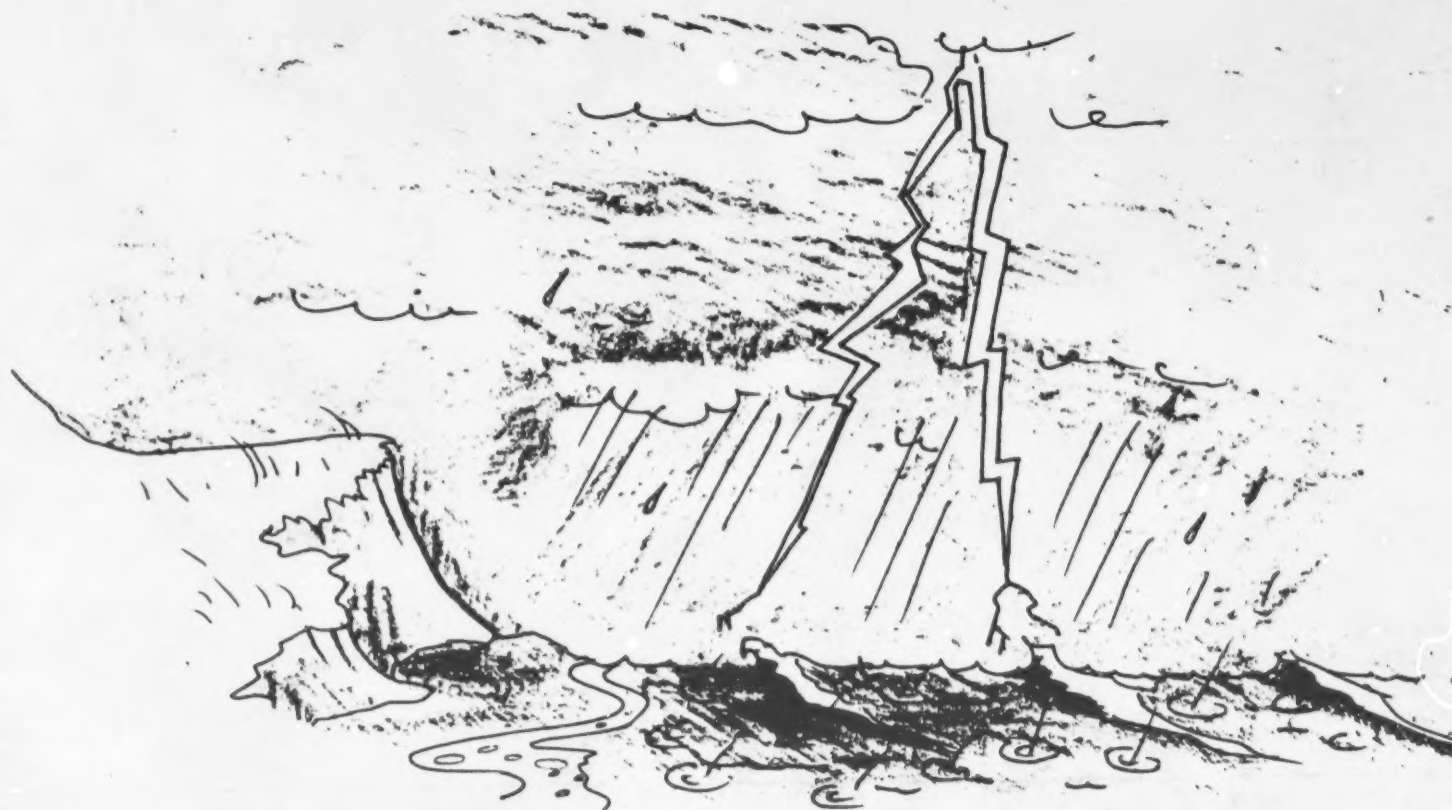
Stratus clouds are formed when a layer of air is cooled below the saturation point without vertical movement. They appear from 600 to 2100 meters (2,000 to 7,000 feet) and are in sheets or foglike layers. Stratus clouds often mean bad weather ahead.



(3) Cirrus Clouds- ("Cirrus" is a Latin word which means "curl" or "ringlet".) Cirrus clouds are the highest clouds in the sky (7,600 meters [25,000 feet] or above) and are feathery wisps of curly white crystals. They look delicate and are frequently blown about. Cirrus clouds often are storm warnings.



(4) Nimbus Clouds- ("Nimbus" means "rainstorm" in Latin.) Nimbus clouds are usually dark gray, without any definite shape. They appear at low altitude, have a wet look, and often have streaks of rain extending to the ground. They are the true rain clouds.





Combinations of all these different types of clouds are possible. Scientists also use "alto" to describe high clouds. Alto-stratus or alto-cumulus tells us how high these clouds are.

cumulus
clouds 

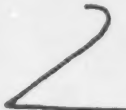
CLOUD SYMBOLS USED BY SCIENTISTS ARE:

stratus
clouds 

cirrocumulus
clouds 

alto-cumulus
clouds 

cirrus
clouds 

cirrostratus
clouds 

Strato-cumulus
clouds 

nimbus
clouds 

alto-stratus
clouds 

cumulonimbus
clouds 

FIRST
ACTIVITY
FOR
SKILL B

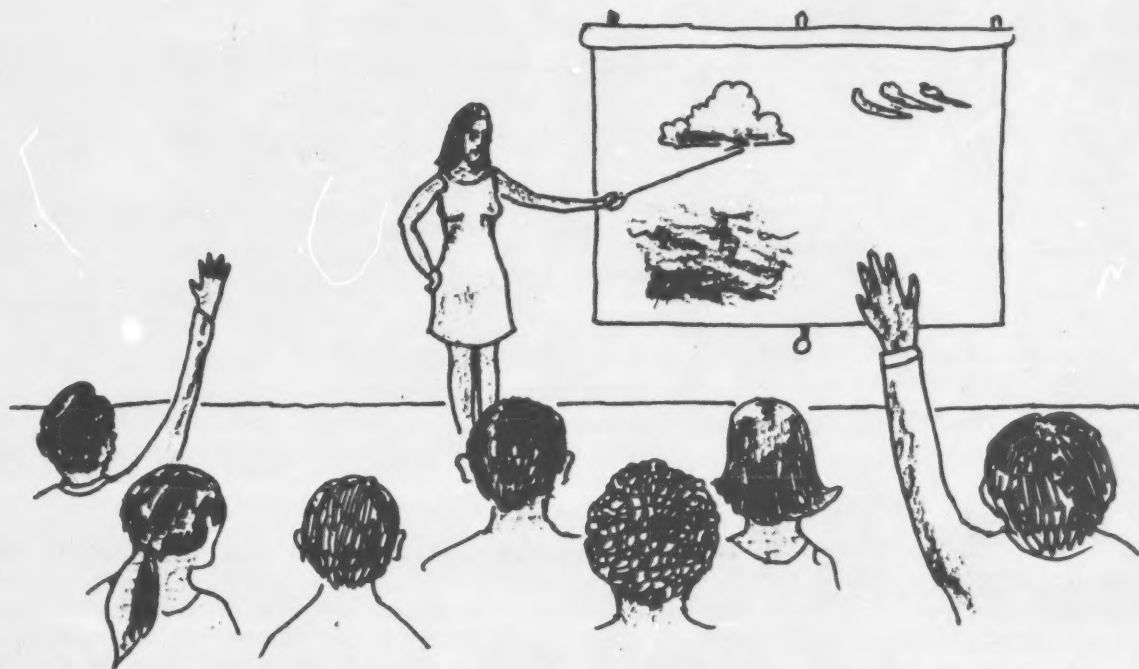
Ask the students to make a chart and record for 2 weeks the cloud type observed daily. There will be times when the students will have a difficult time deciding to which basic group that particular cloud belongs. Ask them about the differences within the cumulus, stratus, cirrus, or nimbus clouds. Hence, bring up the need for clearer and finer definitions. ¿Qué clase de nube es la más común durante estas dos semanas?

SECOND
ACTIVITY
FOR
SKILL B

Bring in pictures of clouds and ask the students to separate them into the four basic types of clouds. Once again, note the differences within each group. Have the students write the correct symbols for each picture. ¿Qué clase de nubes se encuentran en Puerto Rico?

THIRD
ACTIVITY
FOR
SKILL B

Show pictures of
clouds and ask the
students to pre-
dict what kind of
weather is expected
with each cloud.



FOURTH
ACTIVITY
FOR
SKILL B

Divide the class into teams. Ask each team to record the cloud type observed as they come to school first thing in the morning. Then they are to predict the weather conditions for that late afternoon or evening. The next morning they should repeat the same thing including whether their prediction for the evening before had been correct. This should be done for about one month's time. At the end of the month have the students graph the following:

- a) Total Number of Correct Predictions and the Number of Days
- b) The Type of Cloud and the Number of Occurrences of that Cloud

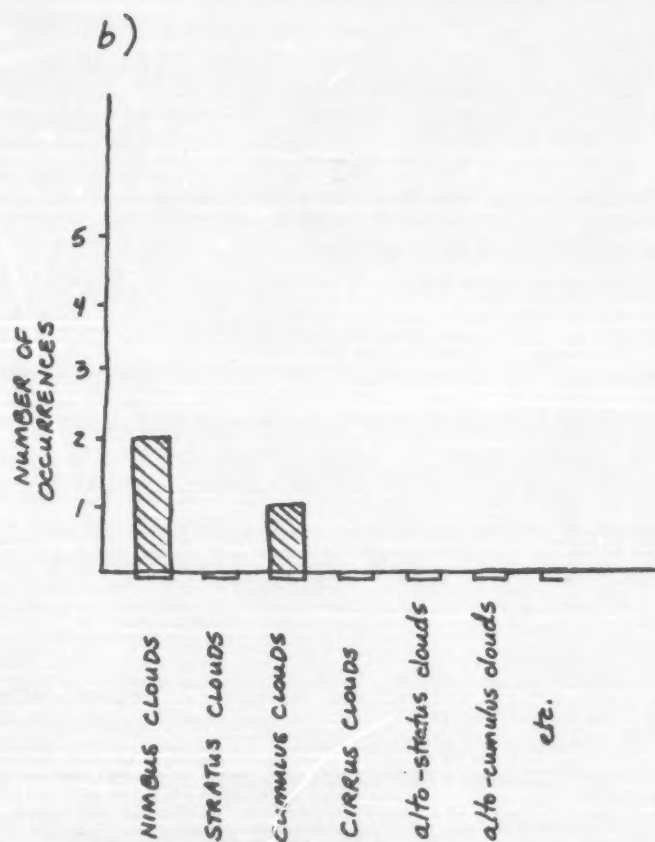
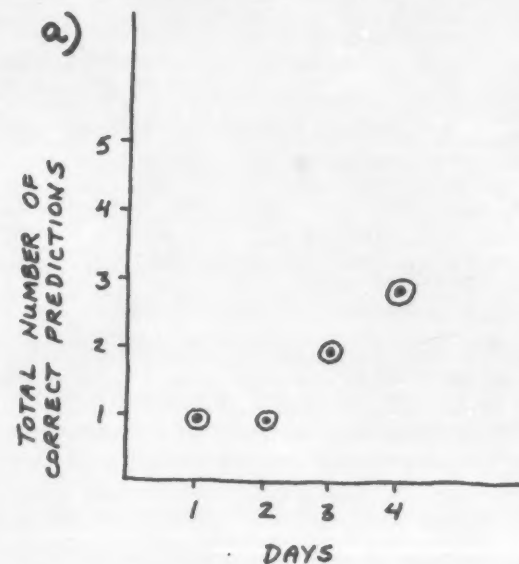
The DATA SHEET and the graphs may look something like this.

DATA SHEET					
DATE	CLOUD TYPE	WEATHER PREDICTION	CORRECT PREDICTION ?	TOTAL NUMBER OF CORRECT PREDICTIONS UP TO NOW	
10/1 DAY 1	NIMBUS	RAIN	YES	1	
10/2 DAY 2	NIMBUS	RAIN	NO	1	
10/3 DAY 3	NONE	SUNNY	YES	2	
10/4 DAY 4	CUMULUS	SUNNY	YES	3	

SCIENCE CURRICULUM FOR GRADE THREE

UNIT VII: AMERICAN INDIANS

a) Total Number of Correct Predictions and the Number of Days



b) The Type of Cloud and the Number of Occurrences of that Cloud

SKILL C: Is able to understand what causes rain.

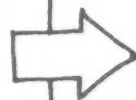
VOCABULARY: water vapor
gravity
condenses

FIRST
ACTIVITY
FOR
SKILL C

Recall the experiment with formation of clouds. Every cloud is made of water droplets or ice crystals. Using a boiling coffee pot, hot plate, ice cubes and a pan, the students can make cloud and rain. When water vapor from a boiling coffee pot spout is cooled by the air around it, a small cloud forms. The water vapor is said to have condensed on the dust particles in the air which is cool, thus forming clouds. Put ice cubes in a pan. The ice cubes make the pan cold. Hold the pan near the cloud from the coffee pot. Now the cloud becomes much cooler. When the little water droplets in the cloud are cooled, they come together and make big drops. The big drops are heavy and the earth's gravity pulls them down. Thus we get rain.



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SKILL D: Is able to understand why it does not rain constantly from all clouds.

VOCABULARY: gravity
coalescence
coalesce
diameter
relative size

BACKGROUND

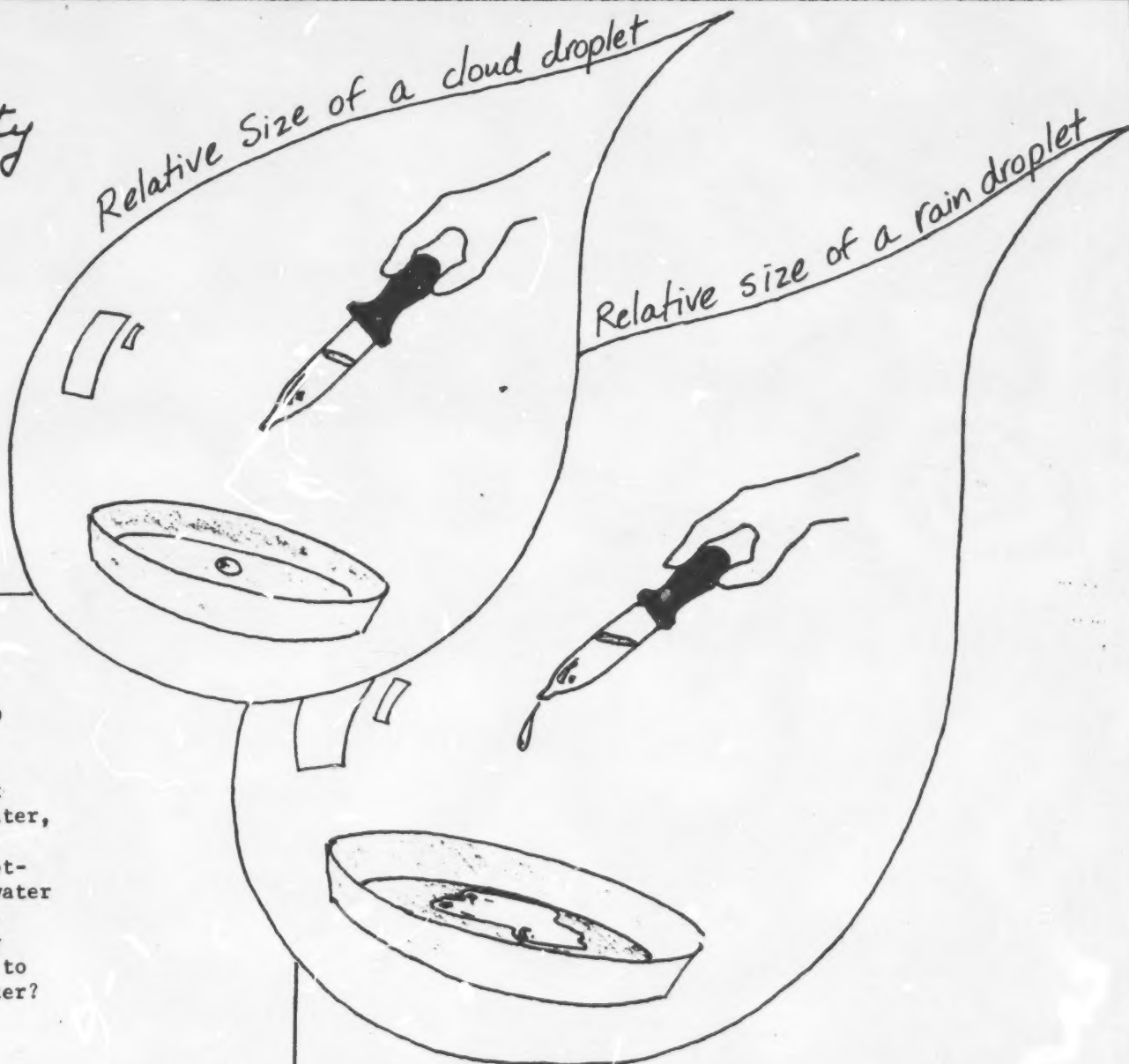
Since every cloud is made of water droplets or ice crystals why do we not get rain from all the clouds? The answer to that is the water droplets or ice crystals in clouds are very very small. Because they are so small, the effect of gravity on them is minute. The movement of the air current lifts the droplets while gravity pulls down on them. Although the droplets are in constant motion, there is no downward movement. The cloud droplet of an average size is only $1/1,000$ cm ($1/2,500$ inch) in diameter. When it gets to be 20 times larger than that, or $1/50$ cm ($2/250$ inch) then it can fall from the cloud as rain. The growth of a cloud droplet to a size large enough to fall out is the cause of rain. This important growth process is called "coalescence."

FIRST
ACTIVITY
FOR
SKILL D

RELATIVE SIZES OF A CLOUD DROPLET AND A RAIN DROPLET.

Let the students get an idea of the relative size of a cloud droplet and the smallest rain droplet. Using an eye dropper and a glass of water, use 1 drop to represent the size of a cloud droplet and 20 drops or more to represent the size of a rain droplet.

First Activity
For
Skill D



SECOND
ACTIVITY
FOR
SKILL D

RELATIVE SIZES OF
CLOUD DROPLETS AND
RAIN DROPLETS.

MATERIALS: Windex
bottle, colored water,
paper.
Hold the windex bot-
tle with colored water
1 foot from paper.
Squeeze. How many
times do you have to
squeeze to get water?

THIRD
ACTIVITY
FOR
SKILL D

MATERIALS: Coffee pot,
hot plate, 2 sauce pans,
ice.

Recall the experiment where you made clouds by boiling water from a coffee pot. Now hold one pan over the water vapor. Notice that the bottom of the pan is wet. Place ice in the other pan and hold the pan over the water vapor. The water droplets grow in size as the air becomes colder. The vapor condenses into large drops as it hits the cold surface and these large drops fall just as rain does. ¿Cuál es la diferencia entre las dos cacerolas?



SKILL E: Is able to make and use a rain gauge.

VOCABULARY: gauge
rain gauge
instrument

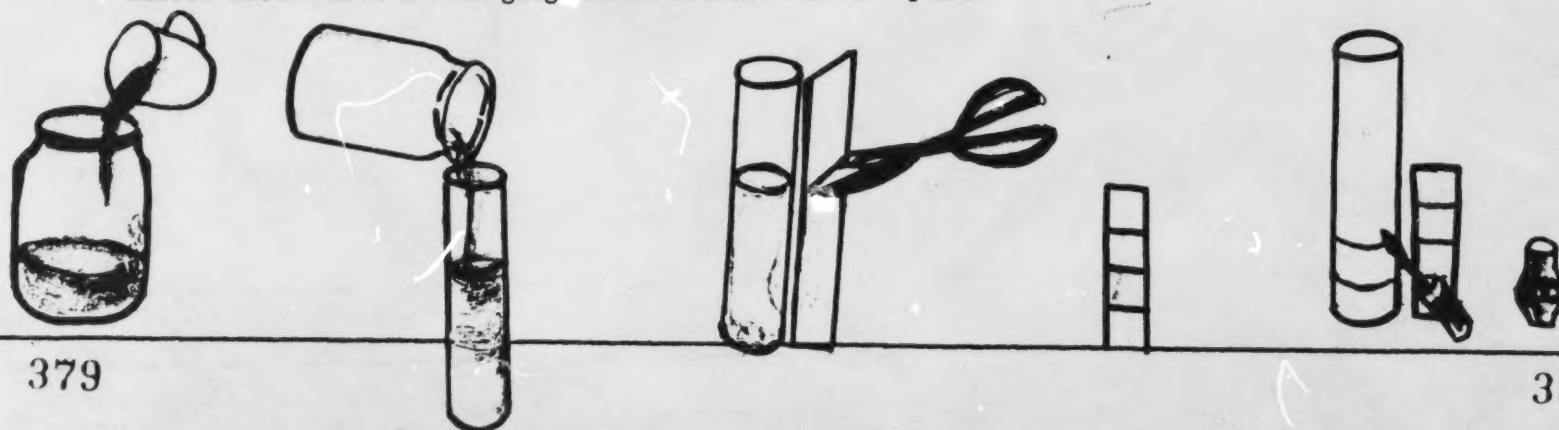
BACKGROUND

An instrument used for measuring the amount of rain that has fallen in a certain area is called a rain gauge. Scientists use this instrument to record the amount of rain that has fallen.

FIRST MAKING A RAIN GAUGE

ACTIVITY **MATERIALS NEEDED:** Metric ruler, 1 wide-mouthed jar with straight sides, tall and narrow bottles (from olives), red nail polish, and paper strip.

FOR SKILL E **Method:** Pour into the wide-mouthed jar exactly 2 cm of water. Pout the water into one narrow bottle and divide the columns of water into four equal parts. Cut a paper strip the length of the column. Now fold it into 4 equal parts. Use red nail polish to paint the bottle into $\frac{1}{2}$ cm divisions by following the folds and ends of the paper strip. The wide-mouthed jar and the narrow bottle make a rain gauge which measures to the $\frac{1}{2}$ cm.



Encourage the students to ask about the need for a wide-mouthed jar as a rain collector. Why not use the narrow jar as the collector? Ask them questions about the angles or directions in which rain falls. In which case does the wide-mouthed jar NOT make a difference as a rain collector?



A

FIRST
ACTIVITY
FOR
SKILL E (cont'd.)

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B



C

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SCIENCE CURRICULUM FOR GRADE THREE

UNIT VII: AMERICAN INDIANS

SECOND
ACTIVITY
FOR
SKILL E

USING A RAIN GAUGE - (Before using the rain gauge to measure rain the teacher should pour into the gauge various amounts of water and check to make sure that the students can indeed read the gauge).

For a two week period the wide-mouthed jar should be placed outside daily where rain can be collected. There should be a specific time when the jar is placed outside and a specific time when the jar is taken into the classroom. For example, the jar may be placed outside at 1:00 p.m. every school day and taken in for measurement at 9:00 a.m. the next morning. Take the collected rain and pour it into the narrow bottles one at a time. Ask the students to make a chart measuring the amount of rain that has fallen in centimeters.

THIRD
ACTIVITY
FOR
SKILL E

COMPARING THE AMOUNT OF RAINFALL IN DIFFERENT LOCATIONS.

MATERIALS NEEDED: Same as activity 1 except 3 or more wide-mouthed jars of the same size.

Place the wide-mouthed jars in different places (some partially protected by an overhang, some totally exposed to the sky, some partially shielded by the side of a building, etc.) Some children may even wish to collect rain-water from their own neighborhood. Using the same narrow bottles as gauges, a comparison of the amount of rainfall in different areas may be made. The teacher may wish to discuss possible good places for shelter chosen by an Indian brave caught in the rain. What about wind directions? Why are there differences in amounts of rain collected? Why not? Notice in the picture that on day 4 Maria's jar collected only $\frac{1}{2}$ cm of rain while Nicole's jar collected 1 cm of rain.

